GENERAL ZOOLOGY

or

SYSTEMATIC NATURAL HISTORY

by

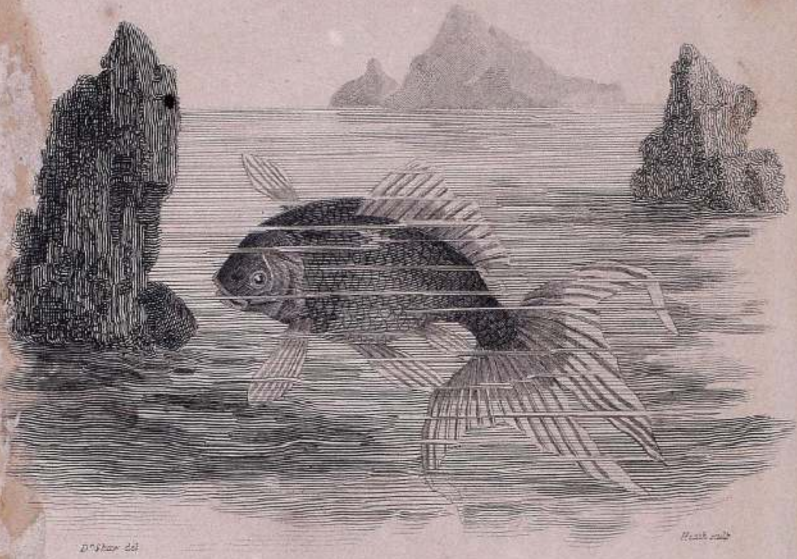
GEORGE SHAW, M.D. F.R.S. &c.

WITH PLATES

from the first Authorities and most select specimens

Engraved principally by

MR. HEATH.



VOL. V. Part 1.

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1804.

GENERAL ZOOLOGY.

VOLUME V.—PART I.

PISCES.

THE TANJORE MAHARAJA SERFOJI'S SARASWATI MAHAL.

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Directions for placing the Plates in vol. V. part I.

The Vignette represents a diminished view of the Four-Lobed Carp. See p. 212.

The plate following the Vignette represents the gradual progress of the generality of fishes from the egg or spawn. Fig. 1. 2. part of a water-plant with some ova adhering to the leaves. Fig. 3. an egg magnified. Fig. 4. the appearance of the eggs on the seventh day, the eyes of the included embryo being visible in the form of two black specks. Fig. 5. 6. magnified views of the egg on the point of hatching. Fig. 7. natural size of the young, the smallest figure shewing it newly hatched, the next eight hours after, and the third of three weeks' growth. Fig. 8. a young Bream of one day's growth, viewed from above by a microscope. Fig. 9. profile view of the same. Fig. 10. microscopic view of a young Bream of four days' growth, shewing the heart, with the aorta, cava, &c. &c. &c. Fig. 11. magnified view of the incipient scales. Fig. 12. the heart and commencement of the aorta by the microscope.

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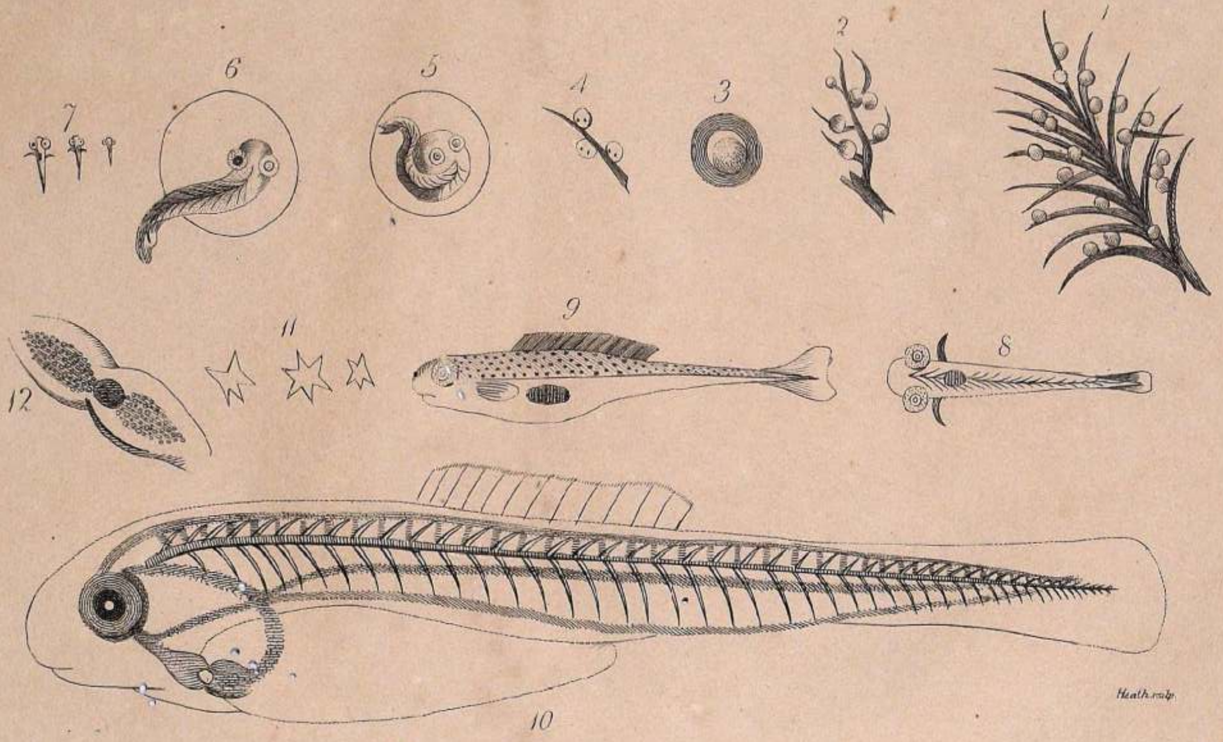
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Heath sculp.

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ERRATA.—VOL. V. PART I.

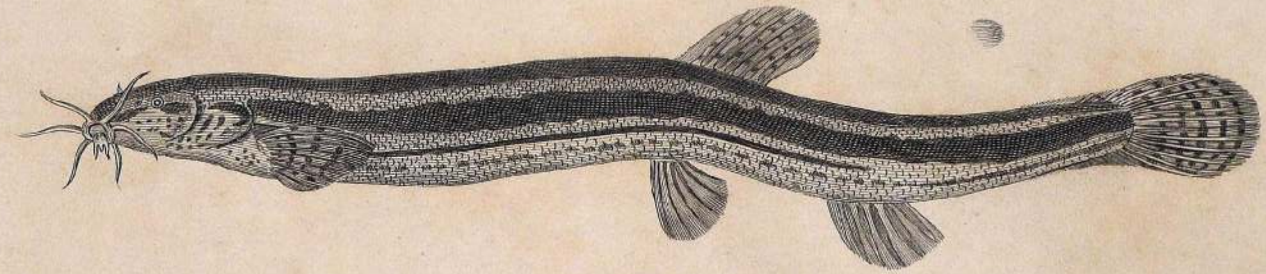
P. 89, in the description of the Mudschan Salmon, l. 4, dele *of the above fishes*.

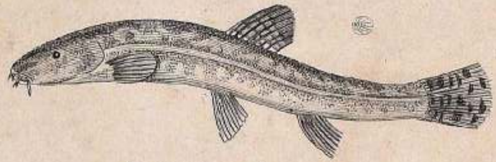
P. 141, in the generic character of Exocoetus, after Head scaly, read *Jaws connected on each side*.

P. 206, in the description of the Bynni Carp, l. 9, dele *and*.

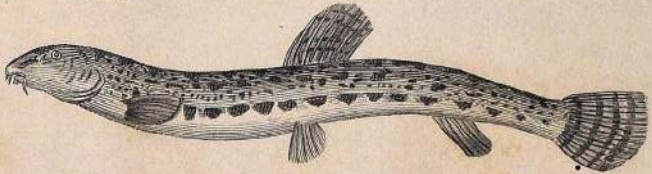
*** *The sixth and succeeding Volumes of this Work will be published with all reasonable expedition.*

GREAT LOCHE.





COMMON LOCHE.



SPINY LOCHE.

Heath sculp.

1804, June 2, London Published by G. Kearsley, Fleet Street.

FISHES.

ORDER

ABDOMINALES.

COBITIS. LOCHE.

Generic Character.

Os (plerisque) cirrosum.	*Mouth*, in most species, bearded.
Oculi in suprema capitis parte.	*Eyes* situated in the upper part of the head.
Corpus fere æquale.	*Body* nearly of equal thickness from head to tail.
Squamæ parvæ.	*Scales* small, easily deciduous.
Vesica natatoria ossea.*	*Air-Bladder* hard or osseous.

COMMON LOCHE.

Cobitis Barbatula. *C. flavo-cinerea fusco variata, capite lævi compresso, cirris sex.*

Yellow-grey Loche, with dusky variegations, smooth compressed head, and six beards.

Cobitis cirris sex, capite inermi compresso. *Lin. Syst. Nat. p.* 499. *Bloch. t.* 31. *f.* 3.

Bearded Loche. *Penn. Brit. Zool.* 3.

THE common Loche is found in many parts of Europe, as France, Germany, Italy, &c. &c. It is

* *Bloch.*

an inhabitant of clear rivulets, where it commonly resides at the bottom among gravel, &c. and is on that account called in some parts of England by the name of Groundling. It is well described by Mr. Pennant, who informs us that it sometimes, though rarely, arrives at the length of four inches and three quarters, though it is generally found much smaller, viz. about three inches in length: the mouth is small, placed beneath, and destitute of teeth: on the upper mandible are six small beards, viz. one at each corner of the mouth, and four at the end of the nose: the body is smooth, slippery, and almost of an uniform thickness throughout: the colour of the head, back, and sides is in some white, in others of a dirty yellow, very elegantly marked with large spots consisting of numberless minute black specks: the pectoral, dorsal, and caudal fins are also spotted: the belly and ventral fins are of a pure white: the tail broad, and a little rounded. Dr. Bloch informs us that this fish is covered with small scales; a particular which seems to have escaped the attention of the generality of describers: he also informs us that the Loche dies very soon after being taken out of the water, and even when it is placed for any length of time in still water; and as it is a fish which is supposed very soon to lose its fine flavour, it is usual to agitate from time to time the vessel of water in which it is carried to any distance in order to be dressed for the table. In point of delicacy it is said to be equal, if not superior, to most other fishes, and is cultivated with much care in some

parts of Europe as an article of diet. It is supposed to live principally on aquatic insects, worms, &c. In Germany it is observed to spawn in the month of March, and is a very prolific animal *.

GREAT LOCHE.

Cobitis Fossilis. *C. fusco-flavescens, striis longitudinalibus nigricantibus, cirris octo, spina utrinque supraoculari.*

Yellow-brown Loche, with longitudinal blackish stripes, eight beards, and a spine above each eye.

Cobitis fossilis cirris octo, spina supraoculari. *Lin. Syst. Nat. p.* 500. *Bloch. c.* 31. *f.* 1.

THIS species is the largest of the genus, and is a native of Germany and other midland parts of Europe, inhabiting large lakes and marshes. It arrives at the length of eight, ten, or even sometimes fifteen inches, and is of a dull yellowish-brown colour, marked above by several longitudinal, deep-brown or blackish stripes from head to tail: the body is covered with very small and tender scales. This species conceals itself during the winter, and even at other times when the marshes it inhabits begin to grow dry, at some distance beneath the surface of the mud, out of which it is occasionally dug, and has in consequence been erroneously represented by some authors as capable of living in the ground in the manner of the slow-worm. On

* This did not escape the observation of Shakespeare.

the approach of stormy weather it is observed to be unusually restless; quitting the muddy bottom in which it generally resides, and swimming about near the surface of the water. It has therefore been sometimes kept by way of a living barometer, since when placed in a vessel of water with some earth at the bottom, it never fails to predict the approach of a storm by rising from the bottom of the vessel, and swimming about in an unquiet manner near the surface. When kept for this purpose it should be provided with fresh water and earth two or three times a week in summer, and once a week, or once in ten days, in the winter: it must also be kept during frosty weather in a warm room. It is a prolific fish, and is remarkably tenacious of life.

SPINY LOCHE.

Cobitis Tænia. *C. griseo-flavescens, fusco maculata, cirris sex brevibus, spina utrinque suboculari.*

Yellow-grey Loche, with dusky spots, six short beards, and a spine beneath each eye.

Cobitis Tænia. *C. cirris sex, spina suboculari. Lin. Syst. Nat. p.* 499. *Bloch. t.* 31. *f.* 2.

This is distinguished by a double spine situated on each side the head, at a small distance before the eyes. In colour and size it much resembles the common loche, and is a native of Germany, &c. inhabiting similar situations with the common species. Dr. Bloch informs us that on placing a

pair of these animals in a glass of river water with a quantity of mud, they shewed an opposite disposition to that of the great loche with respect to the changes of the weather; since they moved briskly during calm weather instead of remaining still like that species.

HETEROCLITE LOCHE.

Cobitis Heteroclita. *C. fusca, subtus flavescens, squamis magnis, ore imberbi.*

Brown Loche, yellowish beneath, with large scales, and beardless mouth.

Cobitis heteroclita. *C. capite imberbi, pinna dorsali analique albo-punctata, caudali nigro-fasciata. Lin. Syst. Nat. p.* 500.

LENGTH about four inches: dusky above, and yellowish beneath: body covered with large smooth scales: head flattish; lips denticulated: dorsal and anal fins opposite, and seated at a great distance from the head, or beyond the balance of the fish: they are blackish, and powdered with pale transparent specks: tail rounded, spotted with white, and barred with black; the edge being transparent. Native of Carolina, where it is called by the name of mud-fish. Described by Dr. Garden; but doubtful whether, strictly speaking, of this genus.

JAPANESE LOCHE.

Cobitis Japonica. *C. imberbis, capite depresso, mandibulis denticulatis.*

Beardless Loche, with depressed head and denticulated mandibles.

Cobitis Japonica. *C. capite imberbi depresso, mandibulis dentatis. Lin. Syst. Nat. Gmel. p.* 1352. *Houttuyn. Act. Haarl.* 20. *p.* 337.

Length about five inches: native of Japan: first described by *Houttuyn* in the 20th vol. of the Haarlem Transactions. In the dorsal fin are twelve rays; in the pectoral eleven; in the ventral eight; in the anal nine; and in the caudal twenty.

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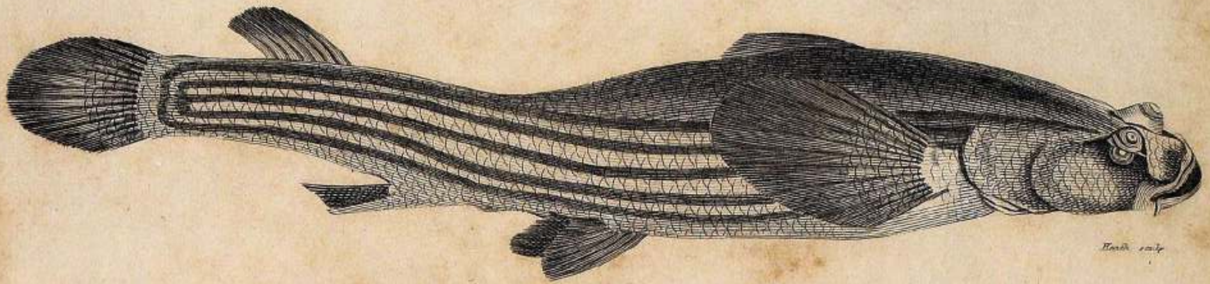


FOUR-EYED ANABLEPS.

1804 June 1 London Published by G. Kearsley Fleet Street.

ANABLEPS. ANABLEPS.

Generic Character.

Caput subdepressum. *Os* terminale. *Dentes* parvi in maxillis.	*Head* subdepressed. *Mouth* terminal. *Teeth* small, on the jaws.
Oculi protuberantes pupillis geminatis.	*Eyes* protuberant, with double pupils.
Membr. branch. radiis sex.	*Gill-membrane* six-rayed.

FOUR-EYED ANABLEPS.

Anableps Tetropthalmus. *A. cinereo-flavescens, lineis utrinque longitudinalibus nigris.*

Yellowish grey Anableps, with longitudinal black lines on each side.

Cobitis Anableps. *C. cirris duobus, capite depresso, oculis prominulis. Lin. Syst. Nat. p.* 499.

Anableps tetropthalmus. *Bloch. t.* 361.

THIS extraordinary fish in its general form bears a near affinity to the genus Cobitis, with which it was indeed united by Linnæus; but the marked particularity of its eyes, &c. amply justify its separation from the rest of the Loches. It seems to have been first described by Artedi, who examined some specimens which occurred in the collection of Seba. The usual length of the animal is from six to eight or ten inches, and its general habit, when viewed laterally, is similar to that of the Loche;

but when viewed from above, it appears of a much more compressed form. It is every where covered with moderately large, rounded scales, proportionally smaller on the head than on other parts. Its colour is a pale yellowish brown, marked on each side by four or five longitudinal blackish stripes; thus resembling in the disposition of its pattern the Cobitis fossilis or great Loche. The most striking particularity in the animal is the extraordinary structure of its eyes, which differ from those of every other known fish: they are extremely protuberant, situated on the upper part of the head, and seem each divided into two distinct eyes united in a common case or tubular receptacle: it appears however, on dissection, that though the anterior half of each eye may be said to be double, or furnished with two pupils, yet the crystalline is in reality single; the appearance of a double eye on each side resulting merely from the deep division of the anterior region. Another particularity in this animal is that the anal fin, according to Gronovius, varies in its structure in different individuals; being in some of a simple or regular form, and furnished with nine soft rays, while in others it is formed into a tube *, which is either solitary, or accompanied by a small additional fin. This curious fish is a native of South America, and is said principally to inhabit the rivers of Surinam, near the sea-coasts. It appears, on dissection, to be viviparous.

* This is probably peculiar to the female fish: its structure is described by Gronovius as internally cartilaginous.

AMIA. AMIA.

Generic Character.

Caput osseum, nudum, scabrum, suturis conspicuum.	*Head* bony, naked, rough, with visible sutures.
Dentes in mandibulis palatoque, acuti, conferti.	*Teeth* both in jaws and palate, close-set, sharp, numerous.
Cirri nasales duo.	*Cirri* or beards two, near the nostrils.
Membr: branch: radiis duodecim.	*Gill-membrane* twelve-ray'd.
Corpus squamosum.	*Body* scaly.

CAROLINIAN AMIA.

Amia Calva. *A. cauda macula nigra.* *Lin. Syst. Nat. p.* 500.
Amia with a black spot at the base of the tail.

THIS is a small fresh-water fish inhabiting some parts of Carolina. The body is slender: the lateral line strait: on the throat are two shield-like bones, striated from the centre: the gill-covers are obstuse and bony: the head bare, as if excoriated: the pectoral and ventral fins are of equal size: the dorsal fin long and sloping: the tail rounded, and marked with a black spot at the upper part of the base. Described by Linnæus from a specimen sent from Carolina by Dr. Garden.

SILURUS. SILURE.

Generic Character.

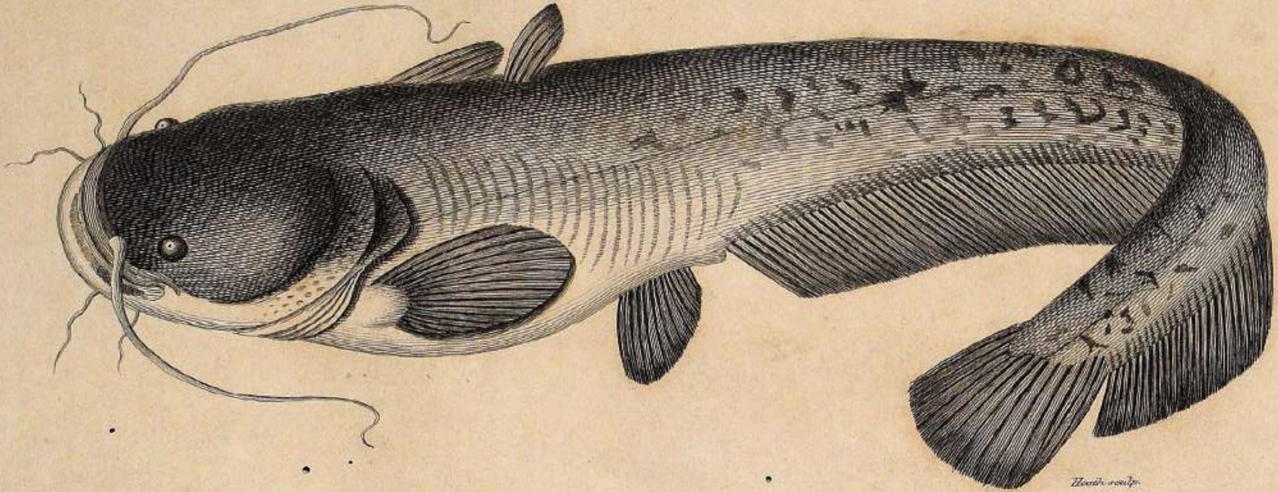
Caput magnum, depressum.
Os amplum, cirris longis tentaculatum.
Corpus elongatum, nudum: *pinnarum pectoralium* aut *dorsalis prioris* radius primus retro dentatus.

Head large, depressed.
Mouth wide, bearded by long tentacula.
Body lengthened, naked: first ray of the *pectoral fins*, or of the *first dorsal fin*, toothed backwards.

EUROPEAN SILURE.

Silurus Glanis. *S. olivaceus, pinna dorsali minima, anali ad caudam continuata.*
Olivaceous Silure, with very small dorsal fin, and anal fin continued to the tail.
Silurus Glanis. *S. pinna dorsali unica mutica, cirris sex. Lin. Syst. Nat. p.* 501.
Silurus Glanis. *Bloch. t.* 34. *Meiding Austr. t.* 9.

THE great or common Silure may perhaps be considered as the largest of all European river fishes; growing to the length of eight, ten, or even fifteen feet, and to the weight of three hundred pounds. Its more general length however is from two to three or four feet. The head is broad and depressed; the body thick and of a lengthened form, with the abdomen very thick and short. It is a fish of a remarkably inert or sluggish disposition,



Heath sculp.

EUROPEAN SILURE.

1804 June 1 London Published by G. Kearsley Fleet Street.

being rarely observed in motion, and commonly lying half imbedded in the soft bottom of the rivers it frequents, under the projecting roots of trees, rocks, logs, or other substances. In this situation it remains, with its wide mouth half open, gently moving about the long cirri or tentacula situated on each side the jaws, which the smaller fishes mistaking for worms, and attempting to seize, become a ready prey to the sluggish Silure. The usual colour of this species is dark olive, varied with irregular spots of black; the abdomen and lips being of a pale flesh-colour, and the fins tinged with violet. It is an inhabitant of the larger rivers of Europe, as well as some parts of Asia and Africa; but appears to be most plentiful in the north of Europe. It is in no very high estimation as a food, the flesh being of a somewhat glutinous nature, but, from its cheapness, is in much request among the inferior ranks, and is eaten either fresh or salted: the skin also, which is smooth, and destitute of apparent scales, is dried and stretched, and after rubbing with oil, becomes of a horny transparency and strength, and is used in some of the northern regions instead of glass for windows. The Silure is not a very prolific fish; depositing but a small quantity of spawn, consisting of large globules or ova: these, as well as the newly hatched young, are frequently the prey of other fishes, frogs, &c. and thus the great increase of the species is prevented. The ova, according to Dr. Bloch, usually hatch in the space of seven or nine days from their exclusion.

MILITARY SILURE.

Silurus Militaris. *S. olivaceus, ossiculis duobus frontalibus suberectis, radio pinnæ dorsalis validissimo, linea laterali flexuosa.*
Olivaceous Silure, with two suberect frontal bony spines, first ray of dorsal fin very strong, and flexuous lateral line.
Silurus militaris. *S. pinna dorsali postica adiposa, cirris duobus rigidis. Lin. Syst. Nat. p.* 503.
Silurus militaris. *Bloch. t.* 362.

Length from twelve to eighteen inches: head and fore-parts broad and depressed: mouth very wide: teeth small and numerous: eyes large: on each side the head, near the nostrils, a very strong, suberect serrated spine or bony process: first ray of the first dorsal fin, (which is lanceolate, and situated near the head,) excessively large, strong, and sharply serrated both on the middle-part and towards the tip: tail slightly bilobate, with rounded lobes. Native of the Indian rivers.

BAGRE SILURE.

Silurus Bagre. *S. virescens, abdomine subargenteo, pinnis pectoralibus dorsalique elongatis, cauda furcata.*
Greenish Silure, with silvery abdomen, elongated dorsal and pectoral fins, and forked tail.
Silurus Bagre. *S. pinna dorsali postica adiposa, radio primo dorsalis pectoraliumque setaceo, cirris quatuor. Lin. Syst. Nat. p.* 505. *Bloch. t.* 365.

Length from twelve to eighteen inches: mouth furnished with four beards, those on the upper lip

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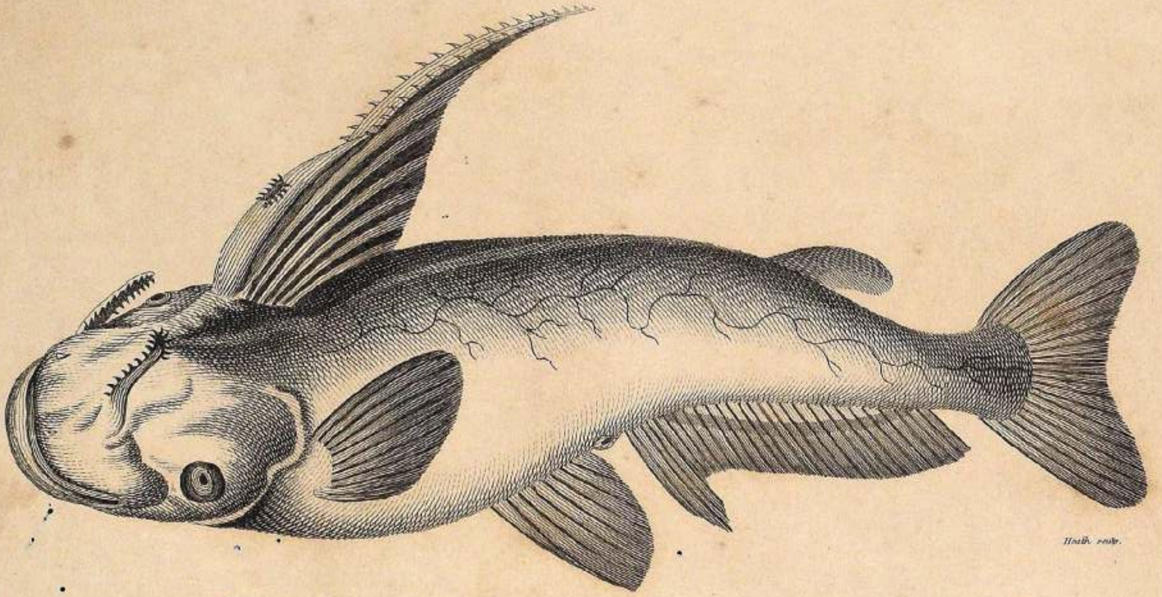


Heath sculp.

MILITARY SILURE.

1804, June 1. London, Published by G. Kearsley, Fleet Street.

long, on the lower short: dorsal fin narrow, with the first ray serrated at the base, and continued into a long filament extending to the tail: at some distance beyond the dorsal fin a single insulated filament, rising from the middle of the back: pectoral fins similar to the dorsal, but the first ray not so long: adipose fin small, and situated near the tail, which, as well as the rest of the fins, is of a pale red, and deeply forked: anal fin bilobate: ventral longish, and rather small. Native of the Indian rivers: seems to vary as to the number of beards on the mouth, which are either four or six.

HERZBERGIAN SILURE.

Silurus Herzbergii. *S. olivaceus, abdomine argenteo, pinnis pectoralibus dorsalique radio primo serrato, cauda furcata.*

Olivaceous Silure, with silvery abdomen, first ray of dorsal and pectoral fins serrated, and forked tail.

Silurus Herzbergii. *S. corpore argenteo, radiis tredecim in pinna ani. Bloch. t.* 367.

Length from twelve to eighteen inches; and probably much more in the full-grown fish: habit resembling that of *Silurus Bagre* and *inermis*: mouth furnished with six beards, the upper pair being of considerable length: first dorsal fin rather small, with the first ray very strong, and serrated: pectoral fins of similar appearance: adipose and ventral fin placed opposite: tail deeply forked. Native of the South-American rivers.

UNARMED SILURE.

Silurus Inermis. *S. subolivaceus, fusco transversim maculato-fasciatus, pinnis inermibus, linea laterali flexuosa.*
Subolivaceous Silure, transversely banded with brown spots, with unarmed fins, and flexuous lateral line.
Silurus inermis. *S. pinna dorsali adiposa, pinnis inermibus, cirris duobus. Lin. Syst. Nat. p.* 503.
Silurus inermis. *Bloch. t.* 363.

LENGTH about a foot: habit more slender than in the preceding: head bony, but smooth, and destitute of spiny processes: mouth without cirri*? first dorsal fin small and lanceolate; second adipose and situated near the tail, which is forked, and of a pale or whitish colour, as is likewise the anal fin. Native of the Indian and South-American rivers.

GALEATED SILURE.

Silurus Galeatus. *S. subfuscus, capite supra in areas subquadratas osseas diviso, linea laterali flexuosa.*
Brownish Silure, with the head divided above into bony squares, and flexuous lateral line.
Silurus galeatus. *S. pinna dorsali postica adiposa, ani radiis vigiuti quatuor, cirris sex, cauda integra. Lin. Syst. Nat. p.* 503.
S. galeatus. *Bloch. t.* 369.

LENGTH eight or ten inches: habit very thick, broad, and short: head large, and covered at the

* Cirri two, according to Linnæus, but very short, resembling tentacula above the nostrils.

top by roughish bony plates, marked into separate divisions, and terminating in a point behind: first ray of the dorsal and of the pectoral fins extremely strong and serrated: beards six: lateral line flexuous: adipose fin small, and placed near the tail, which is short and rounded. Native of South America.

KNOBBED SILURE.

Silurus Nodosus. *S. olivaceus, subtus argenteus, pinnæ dorsalis basi gibbosa.*

Olivaceous Silure, silvery beneath, with the base of the dorsal fin gibbous.

Silurus nodosus. *S. radio primo dorsali nodoso. Bloch. t.* 368.

Length about a foot: habit lengthened: head and foreparts rather large: eyes moderately large: mouth wide, and furnished with six cirri, of which the two upper ones are of considerable length: lateral line flexuose: first ray of the dorsal and pectoral fins very strong and serrated: tail deeply forked. Native of the Indian rivers.

BIMACULATED SILURE.

Silurus Bimaculatus. *S. olivaceus, subtus argenteus, pinna dorsali minima, cauda furcata apicibus nigris.*

Olivaceous Silure, silvery beneath, with very small dorsal fin, and forked tail with black tips.

Silurus bimaculatus. *S. maxilla inferiore longiore. Bloch. t.* 364.

LENGTH twelve inches: body compressed: habit lengthened: head small: upper lip furnished on each side with a long cirrus: lateral line strait: dorsal fin single, most uncommonly small, and situated at the beginning of the back: pectoral fins slightly rounded: ventral very small: vent situated almost immediately beyond the ventral fins: anal fin shallow, extending from the vent to within a small distance of the tail, which is pretty deeply lunated, and of a dull yellowish colour with black tips. Native of the Indian rivers.

FASCIATED SILURE.

Silurus Fasciatus. *S. capite producto, depresso, corpore fasciis numerosis transversis subfuscis.*

Silure with lengthened depressed head, and body marked by numerous transverse brownish bands.

Silurus fasciatus. *S. pinna dorsali postica adiposa, ani radiis tredecim, cirris sex. Lin. Syst. Nat. p.* 505.

Silurus fasciatus. *S. capite longo spatulæformique. Bloch. t.* 366.

LENGTH twelve or fifteen inches: habit long: head long, much depressed, produced and rounded

in front: mouth furnished with six long beards, two on the upper, and four on the lower lip: body elegantly banded with numerous transverse dusky stripes placed in a ternate manner: fins pale, with the rays barred with black: dorsal unarmed and situated near the middle of the back: tail sharply forked. Native of the Indian and South-American rivers.

ELECTRIC SILURE.

Silurus Electricus. *S. cinerascens, versus caudam maculis nigricantibus varius, pinna dorsali unica adiposa, cirris sex.*

Subcinereous Silure, variegated towards the tail with blackish spots, with single, adipose dorsal fin, and six beards.

Silurus electricus. *S. pinna dorsali unica adiposa, cirris sex. Lin. Syst. Nat. Gmel. p.* 1354. *Brouss. act. Paris. ann.* 1782.

Length about twenty inches: head and fore-parts very broad and depressed: on the upper lip two cirri; on the lower four: teeth small and numerous. Native of the African rivers: observed by Forskal in the Nile: possesses a degree of electric or galvanic power, but in a much slighter degree than the Torpedo. Forskal in his *Fauna Arabica* improperly names it Raja Torpedo.

CLARIAS SILURE.

Silurus Clarias. *S. fuscus subtus canus, cirris corpore longioribus, cauda furcata.*
Brown Silure, grey beneath, with beards longer than the body, and forked tail.
Silurus Clarias. *Bloch. t.* 35.
Silurus Clarias. *S. pinna dorsali postica adiposa, ani radiis undecim, cirris sex. Lin. Syst. Nat. p.* 504.

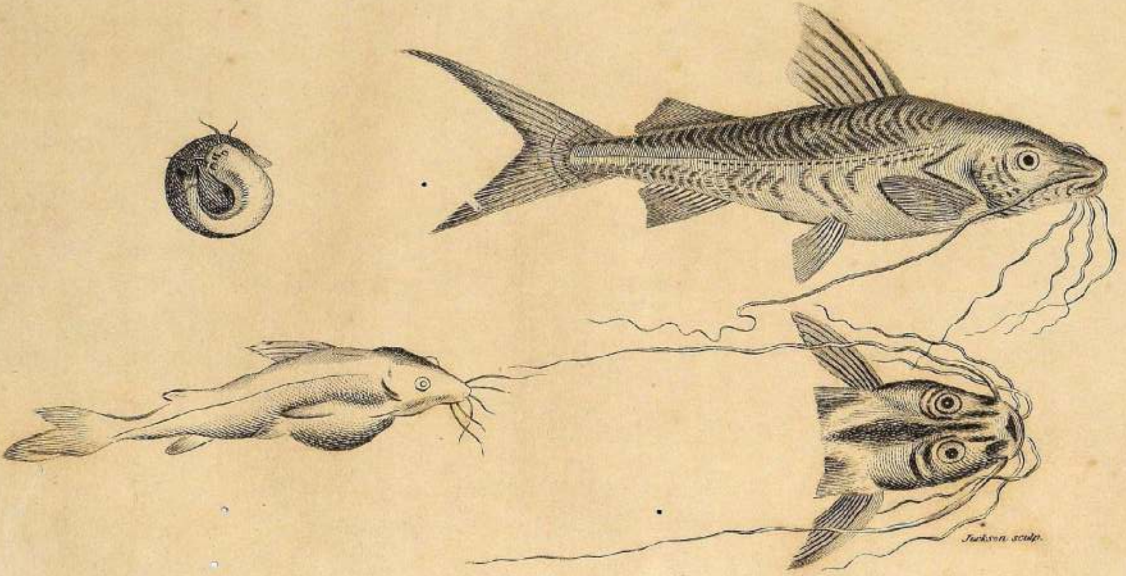
Length twelve or fifteen inches: first ray of the pectoral fins very strong, and serrated: mouth furnished with six beards, two of which, viz. those on the upper lip, are longer than the whole body: back covered by a strong bony shield: upper lobe of the tail longer than the lower, and both sharply terminated. Native of the Indian and South-American rivers.

ASCITIC SILURE.

Silurus Ascita. *S. fuscus, subtus cinereus, cirris corpore longioribus, cauda furcata, pinna ani radiis sex.*
Brown Silure, ash-coloured beneath, with beards longer than the body, forked tail, and eleven rays in the anal fin.
Silurus Ascita. *Bloch. t.* 35.
Silurus Ascita? *Lin. Syst. Nat. p.* 505.

Habit greatly similar to that of S. Clarias: beards six; those of the upper lip longer than the body. This species may be almost said to be viviparous, the young being excluded in the form of very large ova in which the animal is fully formed

CLARIAS SILURE.



Jackson sculp.

1804 May 10. London Publish'd by G Kearsley Fleet Street.

and clearly seen through the surrounding integuments, which it soon breaks; still adhering to the parent for some time, till the yolk of the ovum is consumed. Native of India.

FOUR-SPOTTED SILURE.

Silurus Quadrimaculatus. S. *subfuscus, abdomine argenteo, cirris corpore longioribus, thorace utrinque maculis quatuor nigris.*

Brownish Silure, with silvery abdomen, beards longer than body, and thorax marked on each side by four black spots.

Silurus quadrimaculatus. *S. pinna adiposa longa, radiis novem pinnæ ani. Bloch. t.* 368.

Length about six inches: head and fore-parts rather large: beards six in number, and of considerable length, the upper pair extending nearly to the tip of the tail, which is strongly forked: fins pale yellow: first dorsal rather broad and without any very strong first ray: second or adipose fin broad and shallow: first ray of the pectoral fins strong and serrated: sides of the body marked by the muscles into numerous transverse streaks. Native of the South-American rivers.

RED-FINNED SILURE.

Silurus Erythropterus. *S. rufus, subtus argenteus, pinnis rubris.*
Rufous Silure, with silvery abdomen, and red fins.
Silurus erythropterus. *S. pinna adiposa caudæque longa. Bloch. t. 369. f. 2.*

Habit similar to that of S. quadrimaculatus, but of a longer shape: length seven or eight inches: beards eight in number, viz. two pair above and two below; the lowest pair of those on the upper lip extending nearly to the middle of the tail, which is long, very deeply and sharply forked, and, like the rest of the fins, of a red colour: first ray of the dorsal and pectoral fins very strong and serrated: second or adipose dorsal fin broad and shallow: body marked by transverse streaks as in the S. quadrimaculatus. Native of South America.

FROG SILURE.

Silurus Batrachus. *S. elongatus fuscus, pinna dorsali molli a nucha fere ad caudam continuata.*
Elongated, brown Silure, with soft dorsal fin continued from the neck almost to the tail.
Silurus Batrachus. *S. pinna dorsali unica, radiis sexaginta, cirris octo. Lin. Syst. Nat. p. 502.*
Silurus Batrachus. *S. pinna ani dorsique longa. Bloch. t. 370. f. 1.*

Length eight or ten inches: habit long, as in some of the Blennies; and the divisions of the muscles visible on the sides in the form of so many

transverse lines: head mailed by bony plates, and terminating in a point behind: dorsal fin moderately broad, extending from the beginning of the back to the tail, and without any strong or serrated ray: adipose fin wanting: first ray of the pectoral fins strong and serrated: ventral fins placed at the middle of the abdomen: anal fin commencing at a small distance beyond them, and, like the dorsal, extending nearly to the tail, which is short and rounded: beards eight in number: the lowest pair of those on the upper lip reaching almost as far as the pectoral fins. Native of America.

FOSSILE SILURE.

Silurus Fossilis. *S. fusco-nigricans, subtus canus, capite scutato, pinna anali ad caudam continuata.*

Blackish-brown Silure, grey beneath, with shielded head, and anal fin continued to the tail.

Silurus fossilis. *S. pinna dorsi brevi, ani longa, caudæ rotunda. Bloch. t.* 370. *f.* 2.

Length eight inches: body marked by transverse linear streaks as in the preceding species: head covered by bony shields, and pointed behind: beards eight in number, and of moderate length: dorsal fin small, and situated towards the beginning of the back: adipose fin wanting: pectoral fins small, with the first ray moderately strong: anal broad and continued from the vent to the beginning of the tail, which is small and rounded. Native of the East Indies, inhabiting lakes, where it is sometimes dug out of the mud at the bottom, in the manner of the *Cobitis fossilis.*

VITTATED SILURE.

Silurus Vittatus. *S. fuscus, subtus argenteus, vitta laterali flava supra infraque cæruleo marginata.*

Brown Silure, with subargenteous abdomen, and yellow lateral stripe with blue edges.

Silurus vittatus. *S. vittis longitudinalibus. Bloch. t.* 371. *f.* 2.

Habit resembling that of the *S. quadrimaculatus* and *erythropterus*: shape of the fins and tail nearly the same: length about seven inches: beards eight, of moderate length: sides of the body slightly marked by linear streaks, as in some of the preceding species. Native of India.

ATHERINOID SILURE.

Silurus Atherinoides. *S. subflavescens, dorso subfusco, vitta laterali argentea.*

Subflavescent Silure, with brownish back, and silvery lateral stripe.

Silurus atherinoides. *S. stria longitudinali argentea. Bloch. t.* 371. *f.* 1.

Length about six inches: head small: beards eight, slender, and of moderate length: sides of the body slightly marked by the muscles into linear transverse streaks: first ray of the dorsal, and of the pectoral fins, strong and serrated: adipose fin small and placed near the tail; anal fin slightly coated by very small scales at the base, and reaching from the vent to within a small distance of the tail, which is deeply forked: colour of all the fins pale yellowish brown. Native of the rivers of Malabar.

ASOTE SILURE.

Silurus Asotus. *S. pinna dorsali unica, cirris quatuor. Lin. Syst. Nat. p.* 501.
Silure with single dorsal fin and four beards.

Mouth furnished with four beards, two above and two below: teeth numerous: first ray of the pectoral fins strong and serrated: that of the dorsal fin smooth: anal fin long, and joined to the tail. Native of Asia.

MYSTIC SILURE.

Silurus Mystus. *S. pinna dorsali unica, radiis sex, cirris octo. Lin. Gmel. Mus. Ad. Frid.*
Silure with single eight-rayed dorsal fin, and eight beards.
Silurus Schilde Niloticus. *Hasselq. it. p.* 376.

Native of the Nile: tail forked.

EEL SILURE.

Silurus Anguillaris. *S. pinna dorsali unica, radiis septuaginta, cirris octo. Lin. Gmel. Mus. Ad. Frid.*
Silure with single dorsal fin of seventy rays, and eight beards.
Black-Fish. *Russel. Alepp. p.* 73. *t.* 12. *f.* 1.

Upper cirri two: lateral two; lower four. Native of the Nile.

UNDECIMAL SILURE.

Silurus Undecimalis. *S. pinna dorsi unica, radiis undecim, cirris octo. Lin. Gmel. Mus. Ad. Frid.*
Silure with single dorsal fin of eleven rays, and eight beards.

Native of Surinam: tail forked.

HORNED SILURE.

Silurus Cornutus. *S. pinnis pectoralibus inermibus, radio primo pinnæ dorsalis primæ dentato. Lin. Gmel. Forsk. Arab.*
Silure with unarmed pectoral fins, and first ray of the dorsal fin toothed.

Length about a span; shape oval: body carinated beneath: snout strait, compressed, a little recurved at the tip, and about half the length of the body: first ray of the first dorsal fin extending as far as the middle of the tail, and serrated beneath for about half its length. Native of the Mediterranean.

FELINE SILURE.

Silurus Felis. *S. pinna dorsali postica adiposa, ani radiis viginti tribus, cirris sex, cauda bifida. Lin. Syst. Nat. p.* 503.
Silure with the hinder dorsal fin adipose, twenty-three rays in the anal fin, six beards, and bifid tail.

Four beards on the lower lip; and one on each side the upper: back blueish: ventral and anal fins red: tail bifid. Native of the American seas, and observed about Carolina by Dr. Garden.

CAT SILURE.

Silurus Catus. *S. pinna dorsali postica adiposa, ani radiis viginti, cirris octo. Lin. Syst. Nat. p.* 504.

Silure with the hinder dorsal fin adipose, twenty rays in the anal fin, and eight beards.

Length about two feet: form rounded and thick: colour dusky above, pale flesh-colour beneath: head round: mouth very large: on the upper jaw, beneath each eye, a very long beard: on the lower jaw four short beards: first dorsal fin small and conic: second or adipose fin without rays: rest of the fins small and red: tail forked. Inhabits the sea and rivers of North America, preying on all kinds of smaller fishes; and not sparing even those of its own kind: in taste resembles an eel, and is much esteemed by the Americans: is a fish of slow motion, like the European Silure.

COAN SILURE.

Silurus Cous. *S. pinna dorsali postica adiposa, ani radiis octo, cirris octo, cauda bifurca. Lin. Syst. Nat. p.* 504.

Silure with the hinder dorsal fin adipose, eight rays in the anal fin, eight beards, and forked tail.

Native of Syria.

CARINATED SILURE.

Silurus Carinatus. *S. pinna dorsali postica adiposa, linea laterali spinosa, cirris sex pinnatis.* Lin. Syst. Nat. p. 504.

Silure with the hinder dorsal fin adipose, spiny lateral line, and six pinnated beards.

SHAPE compressed: beard on each side the mouth slightly pinnated beneath: the other four or lower ones shorter, and papillated beneath: lateral line subserrated and carinated with spines, as in some of the *Scombri*: first ray of the first dorsal fin strong, and serrated both above and beneath: that of the pectoral fins toothed in a reversed direction: tail forked. Native of Surinam.

DOCMAC SILURE.

Silurus Docmac. *S. pinna dorsali postica adiposa, ani radiis decem, cirris octo.* Lin. Syst. Nat. Gmel. p. 1357. Forsk. Arab. p. 65.

Silure with the hinder dorsal fin adipose, ten rays in the anal fin, and eight beards.

LENGTH near three feet: colour grey, whitish beneath: head depressed: body convex above: mouth furnished with eight beards; the exterior ones of the upper lip extending half the length of the body: lateral line strait, and situated nearer the back than the abdomen: first ray of dorsal and anal fins long and serrated, with soft tip. Native of the lower Nile, towards the Delta.

CHILIAN SILURE.

Silurus Chilensis. *S. pinna dorsali postica adiposa, cirris quatuor, cauda lanceolata. Lin. Syst. Nat. Gmel. p.* 1359. *Molin. Chil. p.* 199.

Silure with the hinder dorsal fin adipose, four beards, and lanceolate tail.

LENGTH about ten inches: colour brown, whitish beneath: head large, snout obtuse. Native of the fresh waters of Chili, and much esteemed as a food.

BAJAD SILURE.

Silurus Bajad. *S. pinna dorsali postica adiposa, ani radiis duodecim, cirris octo. Lin. Syst. Nat. Gmel.* 1359. *Forsk. Arab. p.* 66.

Silure with the hinder dorsal fin adipose, twelve rays in the anal fin, and eight beards.

LENGTH about a foot: colour glaucous: head obtuse, depressed, and marked on each side, before the eyes, by an unequal pit or depression: upper jaw longer than the lower: exterior beards of the upper lip very long: lateral line at first descending, then strait: above the pectoral fins on each side a very strong spine serrated in a reversed direction: fins rufous: second dorsal or adipose fin long: tail long, dilated towards the tip, and forked. Native of the Nile.

PLATYSTACUS. PLATYSTACUS.

Generic Character.

Habitus Siluri.	*Habit* of Silurus.
Os subtus, cirris barbatum.	*Mouth* beneath, bearded with cirri.
Corpus alepidotum, depressum; cauda longa, compressa.	*Body* scaleless, depressed; tail long, compressed.

ACETABULATED PLATYSTACUS.

Platystacus Cotylephorus. *P. cirris sex, cotyledonibus ventralibus.*

Platystacus with six beards, and ventral acetabula.

Platystacus cotylephorus. *P. cirris sex, cotyledonibus in ventre. Bloch. t.* 372.

Silurus Aspredo. *Lin. Syst. Nat. p.* 502.

Batrachus fuscus, &c. *Klein. misc. pisc.* 5. *p.* 85.

Mystus cirris sex, &c. *Seb. mus.* 3. *p.* 36. *t.* 29. *f.* 9.

THE genus Platystacus, first instituted by Dr. Bloch, is extremely nearly allied to that of Silurus. The species are but few in number: the present is remarkable for the numerous small acetabular processes or suckers with which the under surface of the body is beset, and which in young specimens are but obscurely visible. It grows to the length of a foot or more, and is a fish of a very uncouth

Hill sculp.

ACETABULATED PLATYSTACUS.

1804, June 2. London, Published by G. Kearsley, Fleet Street.

and forbidding appearance, of a dusky brown colour on the upper parts, and pale cinereous beneath: the upper lip is furnished with a strong or callous edge, which is continued on each side into a moderately long cirrus; and on each side the lower lip are two smaller ones: the first ray of the pectoral fins is excessively strong, and edged by a double, serrated border: the dorsal fin is of moderate size, and furnished with six rays: the anal shallow, and continued nearly to the tail, which is small and forked. This fish is a native of the Indian seas and rivers.

PLAIN PLATYSTACUS.

Platystacus Lævus. *Platystacus cirris octo, ventre lævi.*
Platystacus with eight beards, and smooth abdomen.
Platystacus cirris, octo, pinna ani longa. *Bloch.*
Silurus Aspredo. *Lin. Syst. Nat.*
Mystus, &c. *Seb. mus.* 3. *p.* 86. *t.* 29. *f.* 10.

This species in its general appearance so perfectly represents the preceding that it is not to be distinguished from it without particular examination: the colour, number of rays in the fins, and shape, are the same in both; but the abdominal acetabula or suckers are wanting: the mouth is furnished with eight beards: the teeth are stronger than in the preceding fish, and the skin on the upper parts smoother. By Linnæus it was considered as the same species with the former; but Dr. Bloch appears to be of a different opinion. May it not differ in sex only?

WARTED PLATYSTACUS.

Platystacus Verrucosus. *P. fuscus, supra lineis longitudinalibus verrucosis, pinna ani brevi.*

Brown Platystacus, marked above by longitudinal warted lines, with short anal fin.

Platystacus verrucosus. *P. pinna ani brevi. Bloch. t.* 373. *f.* 3.

Aspredo cauda subrotunda, &c. *Gronov. mus.* 2. *p.* 5. *t.* 5. *f.* 3.

Much allied in general appearance to the two preceding species, but smaller and of a less elongated form: mouth furnished with six beards: first ray of the pectoral fins of similar appearance with those of the former species: dorsal fin slightly rounded: anal fin rather short: tail short and rounded: body marked above by three or four longitudinal rows of smaller warts on each side from breast to tail: colour brown above, paler beneath. Native of the Indian seas.

EEL-SHAPED PLATYSTACUS.

Platystacus Anguillaris. *P. fuscus, striis longitudinalibus albis, pinna ani, caudæ, dorsique secundo connatis.*

Brown Platystacus, with longitudinal white stripes, and the second dorsal, anal, and caudal fin united.

Platystacus anguillaris. *P. pinna ani caudæ dorsique secundo connatis. Bloch. t.* 373. *f.* 1.

Length twelve or fifteen inches: form less broad in front than in the preceding species; mouth furnished with eight beards of moderate length; two

Heath sculp.

EEL-SHAPED PLATYSTACUS.

1804, June 1. London, Published by G. Kearsley, Fleet Street.

on each side the upper, and the same number on each side the lower lip: first dorsal fin rather small, with the first ray strong and serrated: pectoral fins of similar size and structure: second dorsal shallow, and continued along the lower part of the back into the tail, which is shaped like that of an eel, and meets the anal fin in a similar manner, which is about the same length with the second dorsal: colour deep brown above, marked on each side the back by two longitudinal white lines: abdomen pale: teeth placed in several rows, and less sharp than in the former kinds. Native of the Indian seas.

LORICARIA. LORICARIA.

Generic Character.

Habitus Siluri.	*Habit* of a Silurus.
Corpus cataphractum.	*Body* mailed.

RIBBED LORICARIA.

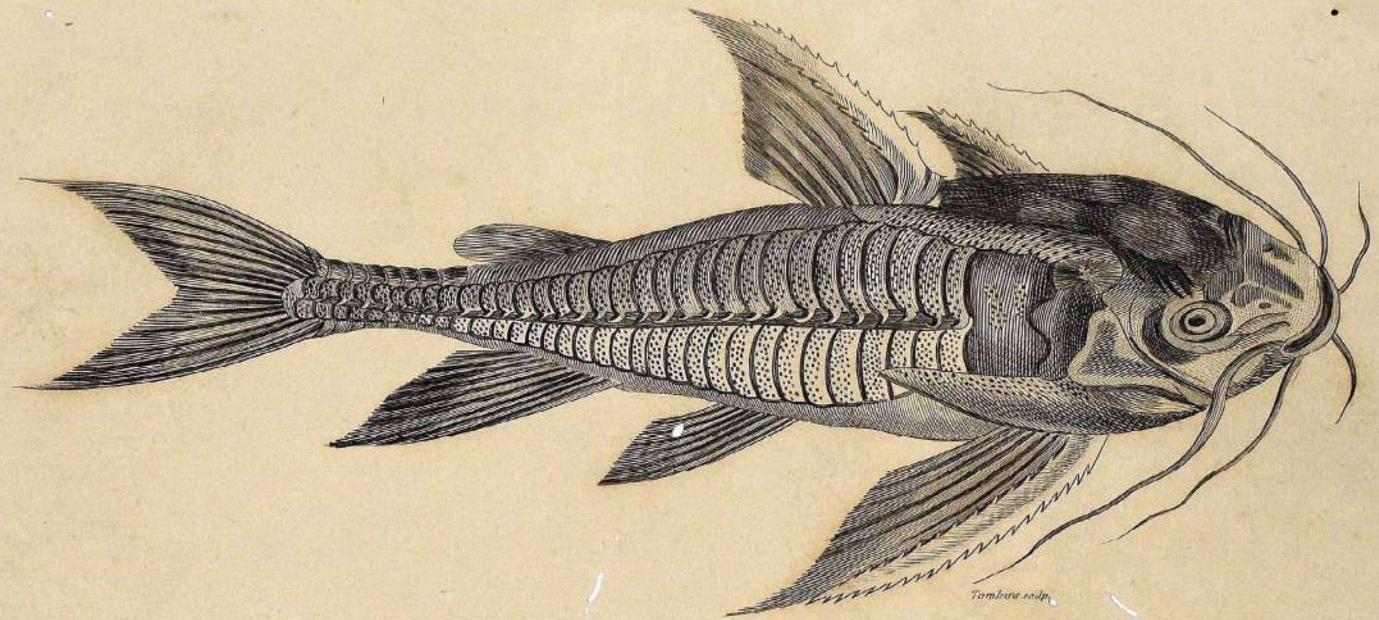
Loricaria Costata. *L. fusco-flavescens, ordine utrinque scutorum simplici, cauda furcata.*

Yellowish-brown Loricaria, mailed by a single row of shields on each side, with forked tail.

Silurus costatus. *S. pinna dorsali postica adiposa, squamis serie simplici, cirris sex, cauda bifida. Lin. Syst. Nat. p.* 506.

Cataphractus costatus. *C. ordine scutorum simplici, pinna caudæ lunata. Bloch. t.* 376.

IN its general habit this fish resembles a species of Silurus, the mouth being furnished with long cirri, and the first rays of the dorsal and pectoral fin serrated: the head is large, depressed, covered by a rough bony shield, projecting on each side the thorax into an excessively strong and obtusely pointed spine or process of considerable length: the first ray of the dorsal and pectoral fins is very thick, strong, sharp, and serrated on both edges: the whole body, from the thorax, is strongly mailed along each side by a continued series of very broad bony plates or scales, each of which projects in the



RIBBED LORICARIA.

1804, June 2, London, Published by G. Kearsley, Fleet Street.

middle into a short hooked spine or curved process: the upper and under parts of the body, from the small or adipose dorsal fin to the tail, are mailed in the same manner, but with smaller plates than on the sides: the tail is moderately large and sharply forked: the beards in this species are six, viz. two on the upper, and four on the lower lip: the colour of the whole fish is yellowish-brown, deepest on the head and back. It is a native of the Indian and American seas. It is a fish of great strength and boldness, and is said to be much dreaded by fishermen; the strength and sharpness of its spines enabling it to inflict very painful and dangerous wounds.

ARMED LORICARIA.

Loricaria Cataphracta. *L. fusca, ordine utrinque scutorum simplici, cauda rotundata.*

Brown Loricaria, mailed by a single row of shields on each side, with rounded tail.

Silurus cataphractus. *S. pinna dorsali postica uniradiata, squamis ordine simplici, cirris sex, cauda integra. Lin. Syst. Nat. p.* 506.

Cataphractus Americanus. *Catesb. Carol. Append. t.* 19.

Greatly allied to the preceding, but differs in having a rounded tail and in some other particulars: length about ten inches: head covered by smooth, angular, bony plates: the sides of the body with a continued series of strong perpendicular, bony scales or plates, each notched in the middle, and furnished, as in the former kind, with a

sharp hook, each plate lapping over the other a little: pectoral fins said to consist of only a strong bone, serrated on each side: dorsal fin formed in a similar manner, but serrated only on the upper side; placed in a socket, and capable of being erected or depressed at pleasure: colour of the whole animal dull brown. Native of the American seas.

SOLDIER LORICARIA.

Loricaria Callichthys. *L. fusca, capite rotundato depresso, squamis utrinque ordine duplici, cauda rotundata.*

Brown Loricaria, with depressed, rounded head, double row of scales on each side, and rounded tail.

Silurus Callichthys. *S. pinna dorsali postica uniradiata, squamis ordine duplici, cirris quatuor. Lin. Syst. Nat. p.* 506.

Cataphractus Callichthys. *C. capite depresso, ordine scutorum duplici. Bloch. t.* 377. *f.* 1.

This remarkable species grows to the length of ten or twelve inches, and is of a dusky brown colour throughout, with a tinge of reddish or yellowish brown on the fins and under parts: the head is short, flat, rounded and of a bony hardness; and on each side is a very strong and thick conical process or blunt spine: the sides of the body are mailed by large strong scales or plates in a double series, to the number of about thirty on each side: they are serrated on the edges, and by their disposition form a furrow along the middle of each side, resembling a lateral line: the back is marked by a similar furrow: the abdomen is flat: the fins

are rather small, and slightly rounded, and the first spine of all the fins is strong and rough: the tail is rather small, rounded, and marked with several small black spots: the eyes are small: the mouth of moderate width and furnished with four long cirri or beards.

It is pretended by Marcgrave that this fish, when distressed by a want of water, or the streams it inhabits becoming too shallow, contrives to make its way over land in order to discover some deeper stream; and occasionally perforates the ground for the same purpose; which latter method should seem to be the most probable of the two.

It is said to be in considerable esteem among the inhabitants of Surinam and other parts as a food, and is, according to Piso, fried and eaten with salt and pepper.

SPECKLED LORICARIA.

Loricaria Punctata. *L. flava, dorso subfusco, squamis utrinque ordine duplici, pinnis nigro-punctatis, cauda furcata.*

Yellow Loricaria, with brownish back, double row of scales on each side, fins speckled with black, and forked tail.

Cataphractus punctatus. *C. capite compresso. Bloch. t. 377. f. 2.*

A SMALL, but elegant species: length five or six inches: shape like that of the generality of fishes: head compressed and pretty much rounded in front: mouth furnished with four beards: sides, from the thorax, mailed by a double series of scales

or shields, finely serrated at the edges, and marked along the middle of the body by small black specks: head and back marked by numerous specks of a rather larger size: colour of the whole fish pale yellow, with a strong cast of reddish brown on the top of the head and back: fins pale-yellow, speckled with black: dorsal fin marked by a large black spot at the tip: tail forked, and barred by rows of black specks. Native of the rivers of Surinam.

STURGEON LORICARIA.

Loricaria Accipenser. *L. elongata fusco-flavescens, ore edentulo, fronte rotundata, pinnis maculatis.*

Lengthened yellowish-brown Loricaria, with toothless mouth, rounded front, and spotted fins.

Loricaria maculata. *L. dentibus carens.* *Bloch. t.* 375. *f.* 1.

Plecostomus, &c. *Gronov. zooph. p.* 127. *n.* 391.

Loricaria cataphracta. *L. pinna dorsi unica, cirris duobus. Lin. Syst. Nat. p.* 508.

Habit long and slender; not ill resembling that of a Sturgeon: head large, and marked into several angular divisions: mouth small, and placed beneath: body mailed on each side the fore-part by a triple row of scaly plates, each marked on the middle by a spiny point; hinder part compressed, and mailed by a single row on each side, the spiny points running down the back and forming a carina on that part: pectoral, ventral, and dorsal fin pale yellow spotted with brown: tail lunated, spotted in a similar manner, with the addition of a large brown patch on the lower lobe: anal fin situated beneath

the middle of the body, and plain or unspotted: colour of the whole fish dull yellowish brown, with a few distant bands of deep-brown spots: surface roughened with small points. Native of the Indian seas, growing to the length of twelve or fifteen inches or more.

TOOTHED LORICARIA.

Loricaria Dentata. *L. elongata fusco-flavescens, ore dentato, cirroso, naso subacuminato.*

Lengthened yellowish-brown Loricaria, with toothed, cirrated mouth, and slightly pointed snout.

Plecostomus dorso monopterygio, &c. *Gronov. zooph. p.* 127.

Loricaria Cataphracta. *L. dentata, pinna dorsi unica. Bloch. t.* 375. *f.* 3. *&* 4.

Loricaria cataphracta. *L. pinna dorsi unica, cirris duobus. Lin. Syst. Nat. p.* 508.

This is so very nearly allied to the preceding, that it might readily pass for the same species, but differs in having the mouth furnished with teeth, and in having a slightly pointed snout: the region surrounding the mouth is also roughened by numerous small filaments or processes: the abdomen is covered rather with middle sized scales than with the broad processes of the former fish; and lastly, the first ray of the tail is much longer in proportion, equalling in some specimens, the length of the whole body. It is a native of the Indian seas.

YELLOW LORICARIA.

Loricaria Flava. *L. flava fusco maculata, cauda striis transversis fuscis, dorso dipterygio.*

Yellow Loricaria, spotted with brown, with two dorsal fins, and tail marked by transverse bands.

Loricaria Plecostomus. *L. pinnis dorsi duabus.* *Bloch. t.* 374.

Accipenser Indicus. *Lin. Mus. Ad. Frid. p.* 55. *t.* 28. *f.* 4.

Loricaria Plecostomus. *Lin. Syst. Nat. p.* 508.

An elegant species: length about ten inches: habit much less slender than in the two preceding: head large, and roughened by minute points: mouth placed beneath: body mailed by four rows of scales or plates on each side, each scale terminated by a short spine: dorsal fin large: second dorsal or spurious fin very small, and blackish: tail lunated, with pointed lobes, the lower somewhat longer than the upper: colour of the whole animal orange-yellow, thickly spotted, except on the head, by small round, deep-brown spots: tail barred by several stripes of the same colour. Native of the Indian seas.

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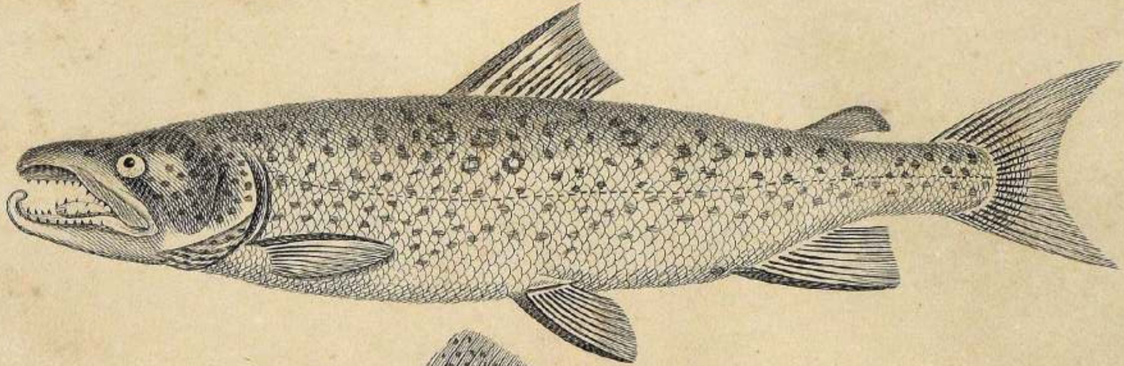
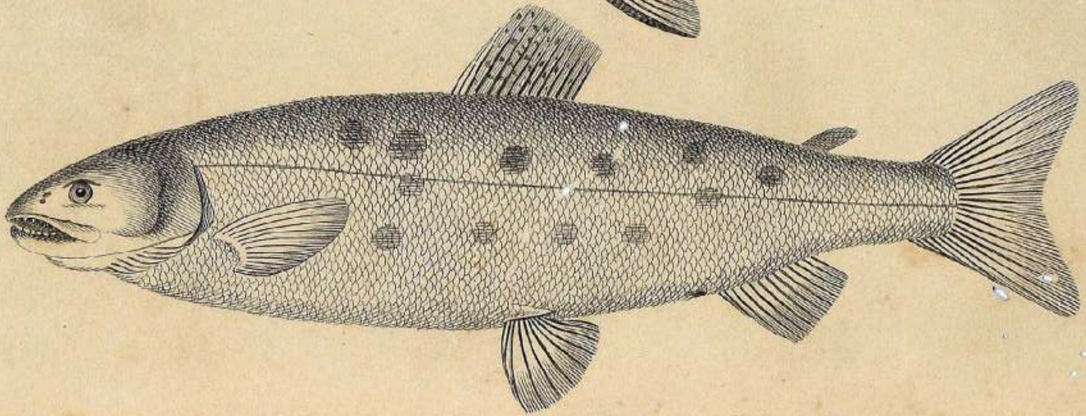
YELLOW LORICARIA.

1804 June 1 London Published by G. Kearsley Fleet Street.

COMMON SALMON. *male.*





Heath sculp.

COMMON SALMON. *female.*

1804 June 1. London. Published by G. Kearsley, Fleet Street.

SALMO. SALMON.

Generic Character.

Caput læve, compressum: *Lingua* cartilaginea: *Dentes* in maxillis, lingua.	*Head* smooth, compressed: *Tongue* cartilaginous. *Teeth* both in the jaws and on the tongue.
Membr: branch: radiis quatuor ad decem.	*Gill-membrane* from four to ten-rayed.
Corpus elongatum, postice pinna adiposa.	*Body* compressed, furnished at the hind part with an adipose fin.

COMMON SALMON.

Salmo Salar. *S. griseo-argenteus, corpore maculato, maxillis maris apice incurvatis.*

Silvery-grey, spotted Salmon, with the jaws (in the male) incurvated.

Salmo Salar. *S. rostro ultra inferiorem maxillam prominente. Lin. Syst. Nat. p.* 509.

Salmo. *Will. ichth. p.* 189. *t.* 11. *f.* 2.

THE Salmon, so highly esteemed for the delicacy of its flavour, and so important an article in a commercial view, is chiefly an inhabitant of the northern regions, where it occurs at different periods both in salt and fresh waters; quitting the sea at certain seasons to deposit its spawn in the gravelly beds of rivers, at a great distance from their mouths. In

order to arrive at the spots proper for this purpose there are scarce any obstacles which the fish will not surmount. They will ascend rivers* for hundreds of miles; force themselves against the most rapid streams, and spring with amazing agility over cataracts of several feet in height. They are taken, according to Mr. Pennant, in the Rhine as high as Basil: they gain the sources of the Lapland rivers, in spite of their torrent-like currents: they surpass the perpendicular falls of Leixlip †, Kennerth ‡, and Pont-Aberglastyn ||. At the latter of these places Mr. Pennant assures us that he has himself witnessed the efforts of the Salmon, and seen scores of fish, some of which succeeded, while others miscarried in the attempt during the time of his observation. It may be added, that the Salmon, like the Swallow, is said to return each season to the self-same spot to deposit its spawn. This has been ascertained by the experiments of Monsr. De la Lande, who fastening a small ring of copper to the tails of some individuals, and then setting them at liberty, found that some of them made their appearance in the same place for three succeeding seasons §. The experiment of fastening gold or silver rings to Salmon is said by Dr. Bloch to have been occasionally practised by some of the Eastern princes, and it is added that by this method a communication has been

* Brit. Zoology.

† Near Dublin.

‡ On the Tivy in S. Wales.

|| Amid Snowdon hills.

§ So Monsr. De la Lande was assured by the fishermen.

proved between the Caspian and Northern seas and the Persian Gulf.

The general history of the Salmon fishery on the river Tweed is amply detailed by Mr. Pennant in the third volume of the British Zoology, chiefly from the communications of Mr. Potts, an inhabitant of the town of Berwick. The principal particulars are as follows.

" At the latter end of the year, or in the month of November, the Salmon begin to press up the river as far as they can reach, in order to spawn. When that time approaches they seek for a place fit for the purpose : the male and female unite in forming a proper receptacle for it in the sand or gravel, about the depth of eighteen inches : in this the female deposits the spawn, which they afterwards cover carefully up by means of their tails, which are observed to have no skin on them for some time after this period. The spawn lies buried till spring, if not disturbed by violent floods, but the Salmon hasten to the sea as soon as they are able, in order to recover their strength : for after spawning they are observed to become very lean, and are then called by the name of Kippers. When the Salmon first enter the rivers they are observed to have a great many small animals adhering to them, especially about the gills : these are the *Lernææ Salmoneæ* of Linnæus, and are signs that the fish is in high season : soon after the Salmon have left the sea, the Lernææ die, and drop off. About the latter end of March the spawn begins to exclude the young, which gra-

dually increase to the length of four or five inches, and are then called Smelts or Smouts. About the beginning of May the river is full of them; it seems to be all alive; and there is no having an idea of their numbers without seeing them; but a seasonable flood then hurries them all to sea, scarce any or very few of them being left in the river. About the middle of June the earliest of the fry begin to drop as it were into the river again from the sea, at that time about twelve, fourteen, or sixteen inches in length, and by a gradual progress, increase in number and size, till about the end of July, which is at Berwick termed the Gilse time (the name given to the fish at that age). At the end of July, or the beginning of August, they lessen in number, but increase in size, some being six, seven, eight, or nine pounds weight. This appears to be a surprising growth; yet we have received from a gentleman at Warrington an instance still more so. A Salmon weighing seven pounds three quarters, taken on the seventh of February, being marked with scissárs on the back fin and tail, and turned into the river, was again taken on the seventeenth of the following March, and then found to weigh seventeen pounds and a half*.

" All fishermen agree that they never find any food in the stomach of this fish. Perhaps during

* According to Dr. Bloch the growth of the Salmon appears to be much slower than here stated. He informs us that a Salmon of five or six years old weighs from ten to twelve pounds.

the spawning time they may entirely neglect their food, as the Phocæ called sea-lions and sea-bears are known to do for months together during the breeding season, and it may be that, like those animals, the Salmon return to sea lank and lean, and come from it in good condition. It is evident that at times their food is both fish and worms, for the angler uses both with good success, as well as a large gaudy artificial fly, which the fish probably mistakes for a gay Libellula or dragon-fly. The capture about the Tweed is prodigious: in a good fishery, often a boat load, and sometimes near two, are taken in a tide. Some few years ago there were above seven hundred fish taken at one hawl, but from fifty to an hundred is very frequent: the coopers in Berwick then begin to salt both Salmon and Gilses in pipes and other large vessels, and afterwards barrel* them to send abroad, having then more than the London markets can take off their hands. Most of the Salmon taken before April, or to the setting in of warm weather, is sent fresh to London in baskets, unless now and then the vessel is disappointed by contrary winds of sailing immediately, in which case the fish is brought ashore again to the cooper's offices and boiled, pickled, and kitted, and sent to the London markets by the same ship, and fresh Salmon put into the baskets in lieu of the stale ones. At the beginning of the season, when a ship is on the point of sailing,

* The Salmon barrel holds above forty-two gallons wine measure.

a clean fresh Salmon shall sell from a shilling to eighteenpence a pound, and most of the time that this part of the trade is carried on, the prices are from five to nine shillings per stone*, the value rising and falling according to the plenty of fish, or the prospect of a fair or foul wind †. Some fish are sent in this manner to London the latter end of September, when the weather proves cool but the fish are then full of large roes, grow very thin-bellied, and are not esteemed either palatable or wholesome. The price of fresh fish in the month of July, when they are most plentiful, has been known to be as low as 8d. per stone.

"The season for fishing in the Tweed begins Novr. the 30th, but the fishermen work very little till after Christmas. It ends on Michaelmas-day; yet the corporation of Berwick (who are the conservators of the river) indulge the fishermen with a fortnight past that time, on account of the change of the style.

"There are on the river forty-one considerable fisheries extending upwards, about fourteen miles from the mouth (the others being of no great value), which are rented for near £5400 per annum. The expence attending the servants' wages, nets, boats, &c. amounts to £5000 more, which together makes

* A stone of Salmon weighs 18lb. 20 ounces and a half, or in other terms, four stones, or forty-six pounds avoirdupoise, is only 3 stones or 42lb. fish-weight at Berwick.

† The Salmon sent from Berwick to London are at present generally packed in ice, which is preserved in ice-houses throughout the winter for that purpose.

up the sum £10400. Now in consequence the produce must defray all, and no less than twenty times the sum of fish will effect it, so that 208000 Salmon must be caught there one year with another."

'The general length of the Salmon is from two and a half to three feet, but sometimes much more*: the male is principally distinguished by the curvature of the jaws; both the upper and lower mandible bending towards each other more or less in different individuals, and at different seasons. The general colour of both sexes is a silvery grey, of a much darker cast on the back: the sides of the male are marked with numerous, small, irregular, dusky and copper-coloured spots, while those of the female exhibit only several rather large, distant, roundish, or somewhat lunated spots of a dark colour. Exclusive of these differences, the male is of a somewhat longer or more slender shape than the female: the scales in the Salmon are middle-sized, and not very strongly adherent.

In the intestinal canal of the Salmon is often found a species of Tænia or tape-worm of about three feet in length. Dr. Bloch informs us that in a Salmon which had been three weeks dead, he found one of these worms still living.

* It is said to be sometimes found of the length of six feet. Mr. Pennant mentions one of seventy-four pounds weight as the largest he ever heard of.

SALMON-TROUT.

Salmo Trutta. *S. griseo-purpurascens, capite, corpore, pinnaque dorsali nigro guttatis.*

Purplish-grey Salmon, with the head, body, and dorsal fin bedropped with black spots.

Salmo Trutta. *S. ocellis nigris iridibus brunneis, pinna pectorali punctata. Lin. Syst. Nat. p.* 509.

Sea Trout. *Penn. Brit. Zool.*

Trutta Salmonata. *Will. ichth. p.* 193.

Greatly allied in point of general appearance to the Salmon, but rarely of equal size: colour purplish or violet, with the head and whole body pretty thickly marked with rather small round dark or blackish spots, surrounded by a paler circle: scales rather small. Native of the European seas, passing, like the Salmon, into rivers to deposit its spawn: is of equal delicacy with the Salmon, and the flesh of similar colour: varies occasionally both in colour and spots, which are sometimes rather angular than round: possesses a considerable degree of phosphoric quality, which seems to reside in the viscid mucus covering the skin. Dr. Bloch observes that the Linnæan specific character of this fish, as given in the Systema Naturæ, cannot be depended upon; since he could not observe on his specimen the points or specks on the pectoral fins. Like the Salmon, this fish is prepared in different methods for sale, being sold both fresh and salted, as well as smoked, pickled, &c. &c.

GREY SALMON.

Salmo Eriox. *S. cinereus, purpureo maculatus, abdomine subargenteo.*

Grey Salmon, with purple spots and subargenteous abdomen.

Salmo Eriox. *S. maculis cinereis, caudæ extremo æquali. Lin. Syst. Nat.* p. 509.

Salmo cinereus seu griseus. *Will. ichth.* p. 193.

Grey Salmon. *Penn. Brit. Zool.*

The inhabitants of the North of England and of South-Wales seem, according to Mr. Pennant, extremely well assured that this is a distinct species from the common Salmon. Mr. Ray also considered it as distinct. The head is larger in proportion than in the Salmon; in the jaws are four rows of teeth, and in the tongue are eight teeth: the back, and sides, above the lateral line, are of a deep grey, spotted with a number of purplish spots: the belly silvery: the tail even at the end. The lower jaw grows hooked when the fish is out of season. It is a strong fish, and does not ascend the fresh water till August, when it rushes up the rivers with great violence, and is rarely taken. It appears in the Esk in Cumberland from July to September, and is then in spawn. Mr. Pennant supposes this to be the fish called by the name of *Sewin* or *Shewin* in South-Wales.

LENOK SALMON.

Salmo Lenok. *S. subaureolus, punctis sparsis fuscis, supra fuscescens, subtus flavescens. Lin. Syst. Nat. Gmel. p.* 1373. *Pall. it.* 2. *p.* 716.

Slightly gilded Salmon, with scattered brown spots, with brownish back, and yellowish abdomen.

LENGTH three feet; of a broadish and thick form: pupils of the eyes angulated in front: dorsal fin spotted: pectoral fins yellowish: ventral reddish: anal deepish red: tail dusky-red and bifid. Inhabits the rocky torrents of the most rapid rivers in Siberia.

NELMA SALMON.

Salmo Nelma. *S. ex albo argenteo, capite maxime elongato, mandibula inferiore multo longiore. Lin. Syst. Nat. Gmel. p.* 1372. *Pall. it.* 2. *p.* 716.

Silvery white Salmon, with greatly elongated head, and lower jaw much longer than the upper.

LENGTH from three to six feet: snout depressed: mouth rather large, and furnished with large lateral laminæ: scales large: tail forked. Inhabits the larger rivers of Siberia.

KUNDSCHA SALMON.

Salmo Kundscha. *S. argenteus, guttis albis, cauda bifurca. Lin. Syst. Nat. Gmel. p.* 1373. *Pall. it.* 2. *p.* 716.
Silvery Salmon, with white spots, and forked tail.

Length about two feet: allied to *S. Eriox*, but with a forked tail: body blueish below the lateral line: irides silvery-yellow: adipose fin small and serrated. This species is said to be common in summer in the bays of the Northern sea, scarcely ever entering rivers.

TAIMEN SALMON.

Salmo Taimen. *S. fuscescens, guttis crebris fuscis adspersus, cauda bifurca. Lin. Syst. Nat. Gmel. p.* 1372. *Pall. it.* 2. *p.* 716.
Brownish Salmon, with numerous brown spots, and forked tail.

Length three feet and a half: colour brownish, with numerous dusky spots: sides slightly silvery: abdomen white: head long; snout a little depressed: teeth hooked: lower jaw rather longer than the upper: dorsal fin brown; ventral whitish; anal deep red; tail dusky-red: flesh white. Inhabits the rivers running into the frozen sea.

HUCHO SALMON.

Salmo Hucho. *S. subelongatus subfuscus, corpore pinnisque fusco-guttatis, cauda bifurca.*

Brownish subelongated Salmon, with body and fins bedropped with brown spots, and forked tail.

Salmo Hucho. *S. oblongus, dentium lineis duabus palati, maculis tantummodo nigris. Lin. Syst. Nat. Gmel. p.* 1369.

Salmo Hucho. *S. maculis rotundis in trunco pinnisque. Bloch. t.* 100.

SHAPE like that of a Salmon but considerably longer in proportion: length from two to four or five feet: colour silvery-grey, with numerous round, deep-brown spots: back dusky: fins (except the ventral which are yellowish) pale purple, thickly spotted with brown, not excepting even the adipose or small fin: tail forked: abdomen plain or unspotted: scales rather small: lateral line nearly strait. Inhabits the Danube, the Bavarian and Austrian lakes, and the rivers of Russia and Siberia: not much esteemed as a food, the flesh wanting firmness.

RED-BELLIED SALMON.

Salmo Erythrinus. *S. supra fuscus ocellis coccineis, abdomine postice coccineo.*
Brown Salmon with red ocellate spots, with the hind part of the abdomen bright-red.
Salmo Erythrinus. *S. ocellis coccineis, mandibulis æqualibus. Lin. Syst. Nat. Gmel. p.* 1368. *Georg. it. p.* 156. *t.* 1. *f.* 1.

Length about two feet: habit that of S. Eriox: body plump: head slightly compressed: snout conic, obtuse: teeth in the palate and jaws in a double arch: tongue broad, toothed: back brown; abdomen red: dorsal fin grey, marked with dirty-red ocellate spots: spurious or small dorsal fin brown and lengthened: pectoral fins paler: ventral and anal deep scarlet: tail reddish-brown and forked. Inhabits the lakes and rivers of Siberia.

COMMON TROUT.

Salmo Fario. *S. griseo-flavescens, maculis rubris, maxilla inferiore sublongiore.*
Yellowish-grey Salmon, with red spots, and lower jaw rather longer than the upper.
Salmo Fario. *S. maculis rubris, maxilla inferiore sublongiore. Lin. Syst. Nat. p.* 509.
Salmo Fario. *S. ocellis rubris, iridibus lucidioribus, pinna anali radiis undecim. Bloch. t.* 22. 23.
Trutta fluviatilis. *Will. ichth.* Trout. *Penn. Brit. Zool.*

The Trout is an inhabitant of clear and cold streams and lakes in most parts of Europe, and

admits of considerable variety as to the tinge both of its ground-colour and spots. Its general length is from twelve to fifteen or sixteen inches, and its colour yellowish-grey, darker or browner on the back, and marked on the sides by several rather distant, round, bright-red spots, each surrounded by a tinge of pale blue-grey. Sometimes the ground-colour of the body is a purplish grey; the red spots much larger, more or less mixed with black, and the belly of a white or silvery cast: the fins are of a pale purplish brown; the dorsal fin marked with several darker spots: the head is rather large, the scales small, and the lateral line strait. The female fish is of a brighter and more beautiful appearance than the male.

Mr. Pennant informs us that in the Lake Llyndivi in South-Wales are Trouts marked with red and black spots as large as sixpences; and others unspotted and of a reddish hue, sometimes weighing near ten pounds; but these latter are said to be bad tasted.

In general the Trout prefers clear, cold, and briskly-running waters, with a stony or gravelly bottom: it swims with rapidity, and, like the Salmon, springs occasionally to a very considerable height in order to surmount any obstacle in its course. It lives on worms, small fishes, shell-fish, and aquatic insects, and is particularly delighted with may-flies (Ephemeræ), as well as with Phryganeæ, Gnats, and their larvæ. It generally spawns in September, or in the colder parts of Europe, in October, and at those times gets among

the roots of trees, stones, &c. in order to deposit its eggs, which are observed to be far less numerous than those of other river-fish*. Yet the Trout, as Bloch observes, is a fish that admits of very considerable increase; owing, no doubt, to the circumstance of most of the voracious kind of fishes avoiding waters of so cold a nature as those which Trouts delight to inhabit; and their increase would be still greater, were they not themselves of a voracious disposition, frequently preying even on each other.

The merit of the Trout as an article of food is too well known to require particular notice. In this respect however, as in other fishes, those are most esteemed which are natives of the clearest waters.

The stomach of this fish is uncommonly strong and thick; but this circumstance is observed to be no where so remarkable as in those found in some of the Irish lakes, and particularly in those of the county of Galway. These are called Gillaroo Trouts: on the most accurate examination however, it does not appear that they are specifically different from the common Trout, but by living much on shell-fish, and swallowing small stones at the same time, their stomachs acquire a much greater degree of thickness, and a kind of muscular appearance, so as to resemble a sort of gizzard.

Mr. Pennant observes, that it is matter of sur-

* They are about the size of peas, and of a bright orange-colour.

prise that the Trout, though so common a fish, should appear to be unnoticed by the ancients, except Ausonius, who is supposed to have intended it by the name of Salar. He mentions it however merely on account of its beauty, and without any thing relative to its merit as a food.

> "Purpureisque Salar stellatus tergora guttis."
> And Salar stain'd with purple drops above.

WHITING SALMON.

Salmo Phinoc. *S. griseo-argenteus, abdomine nitidissimo, pinna dorsali nigro-maculata, cauda nigra furcata.*

Silvery-grey Salmon, with very bright abdomen, dorsal fin spotted with black, and black forked tail.

White Salmon. *Penn. Brit. Zool.*

THIS species, says Mr. Pennant, migrates out of sea into the river Esk in Cumberland from July to September, and is called from its colour the Whiting. When dressed the flesh is red, and most delicious eating: these fishes have, on their first appearance from the salt-water, the Lernæa Salmonea or Salmon-louse adhering to them: both sexes are observed in the river, some having the milt or soft roe, and some the hard or ovarium; but their fry has not yet been observed. This fish is by the Scots called by the name of *Phinoc.* It never exceeds a foot in length: the upper jaw is a little longer than the lower: in the first are two rows of teeth; in the latter one: on the tongue are six teeth: the back is strait: the body of an elegant form: the

lateral line strait: the colour between that and the top of the back is dusky and silvery intermixed; beneath the line of an exquisite silvery whiteness: the first dorsal fin spotted with black: the tail black, and much forked: the first dorsal fin has eleven rays; the pectoral thirteen; the ventral and anal nine.

SAMLET SALMON.

Salmo Salmulus. *S. grisco-cærulescens, maculis distantibus subrubris, cauda furcata.*

Blueish-grey Salmon, with distant reddish spots, and forked tail.

Samlet. *Penn. Brit. Zool.*

Salmulus, Samlet. *Will. ichth. p.* 192.

The Samlet is, according to Pennant, the least of the British species of this genus, and is frequently seen in the river Wye, in the upper part of the Severn, and in the rivers that run into it, in the North of England, and in Wales. It is by several imagined to be the fry of the Salmon; but Mr. Pennant dissents from this opinion for the following reasons: first, it is well known that the Salmon fry never continue in fresh water the whole year, but, as numerous as they appear on their first escape from the spawn, all vanish on the first vernal flood that happens, which sweeps them into the sea, and leaves scarcely one behind: secondly, the growth of Salmon fry is so quick and so considerable as suddenly to exceed the bulk of the largest Samlet; for example, the fry that have quitted the fresh

water in spring, not larger than gudgeons, return into it again a foot or more in length: thirdly, the Salmon obtains a considerable bulk before it begins to breed; the Samlets, on the contrary, are found both male and female of their common size, and are readily distinguished by being furnished with either the hard or soft roe: fourthly, they are found in the fresh waters all times of the year, and even at seasons when the Salmon fry have gained a considerable size. It is well known that at Shrewsbury (where they are called Samsons), they are found in such quantities in the month of September, that a skilful angler, in a coracle, will take with a fly from twelve to sixteen dozen in a day. They spawn in November and December, at which time those of the Severn push up towards the head of that river, quitting the smaller brooks, and return into them again when they have done spawning. They have a general resemblance to the Trout, and must therefore be described comparatively.

The head is proportionally narrower, and the mouth smaller: the body deeper: the length seldom more than six or seven inches; or at most about eight and a half: the pectoral fins have generally but one large black spot, though sometimes a single small one attends it; whereas the pectoral fins of the Trout are more numerously marked: the spurious or fat fin on the back is never tipped with red, nor is the edge of the anal fin white: the spots on the body are fewer, and not so bright: the body is also marked from back to sides with six or seven large blueish bars; but

this Mr. Pennant allows to be not a certain character, as the same is sometimes observed in young Trouts: lastly, the tail of the Samlet is much more forked than that of the Trout. The Samlet is very frequent in the rivers of Scotland, where it is called the *Parr*. It is also common in the Wye, and is there known by the title of *Skirling* or *Laspring*.

SCHIEFFERMÜLLER'S TROUT.

Salmo Schieffermülleri. *S. griseo-purpurascens, maculis parvulis lunatis fuscis, abdomine argenteo.*

Purplish-grey Salmon, with small lunated dusky spots, and silvery abdomen.

Salmo Schieffermülleri. *S. maxilla inferiore longiore, maculis nigris. Lin. Gmel. Bloch. t.* 103.

Shape like that of a Salmon, but somewhat longer in proportion: head sharpish: lower jaw rather longer than the upper: general length about eighteen inches: colour silvery, with a slight cast of purple on the upper parts, deepening into brown on the back: sides obscurely marked by pretty numerous, small, crescent-shaped spots: lateral line strait, and blackish: scales middle-sized, and so slightly fixed as to be easily rubbed off: fins blueish; ventral and anal of a yellowish tinge: tail forked. Inhabits the Baltic sea, and some of the Austrian lakes: as an article of food is in equal esteem with the Salmon, and is sometimes called by the name of the Silver Salmon.

GOEDENIAN TROUT.

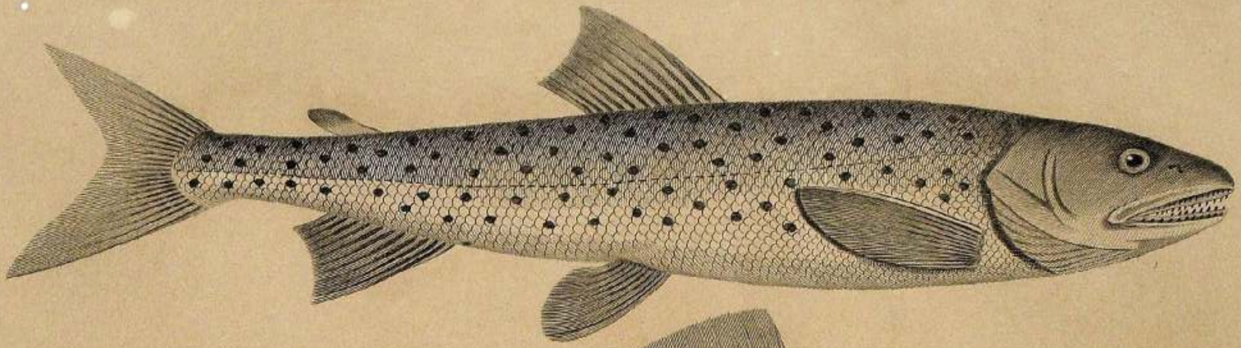
Salmo Goedenii. *S. griseo-argenteus, rubro-maculatus, capite parvo, pinna dorsali maculata.*

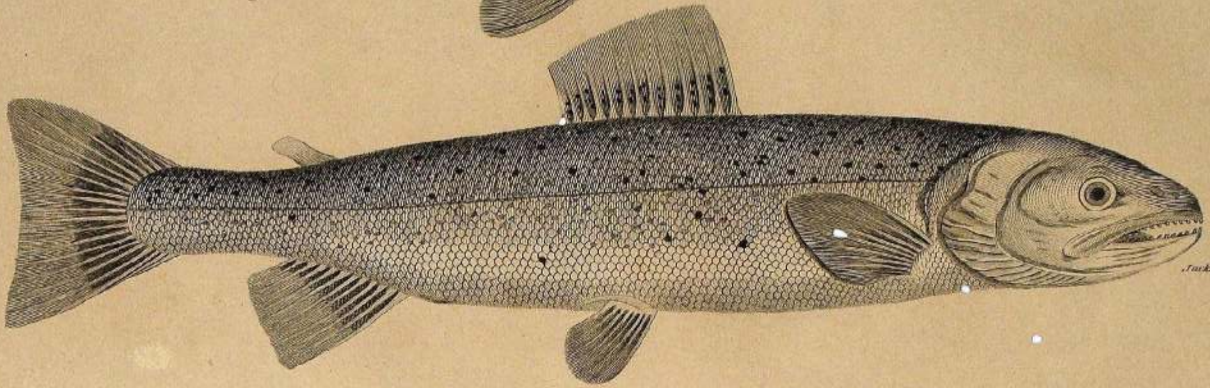
Silvery-grey Trout, with red spots, small head, and spotted dorsal fin.

Salmo Goedenii. *S. capite parvo, maculis rubris ad truncum. Lin. Gmel. Bloch. t.* 102.

Length about eighteen inches: habit that of a trout, but with a longer and thinner body, and a shorter and smaller head: colour silvery, with a dusky or blueish tinge on the back, and the whole body marked with pretty numerous and rather small, round, red spots with pale or whitish edges: scales small: fins blueish or dusky, except the ventral and anal, which are tinged with yellow: dorsal fin marked with small blackish spots: tail forked. Native of the European seas: known in general by the title of Silver Trout.

SALVELIN TROUT.





Jackson sculp.

ALPINE TROUT.

1804. May 10. London. Publish'd by G. Kearsley, Fleet Street.

SALVELIN TROUT.

Salmo Salvelinus. *S. griseo-purpurascens, rubro maculatus, abdomine pinnisque inferioribus coccineis.*

Purplish-grey Trout, with red spots, and lower fins and abdomen scarlet.

Salmo Salvelinus. *S. pedalis, maxilla superiore longiore. Lin. Syst. Nat. p.* 511.

Salmo radio primo in pinna ventrali analique albo. *Bloch. t.* 99.

Red Charr? *Penn. Brit. Zool.*

LENGTH about twelve inches: shape resembling that of the Salmon, but rather more slender: colour of the back dark brownish blue; of the sides silvery, marked with pretty numerous, moderately distant, small, round, red spots, which are sometimes surrounded with a pale margin: belly red or orange-colour: pectoral, ventral, and anal fins the same, but with the two first rays white: dorsal and caudal fin blueish brown: adipose fin small, pale, and tipped with brown: scales rather small than large: lateral line strait: tail moderately bifurcated: both jaws of equal length: irides silvery. Native of mountainous lakes in several parts of Germany, and of several of the rivers in Siberia, and (if this species be the Red Charr of the English) in some of the lakes of our own country, as those of Westmoreland, &c. As in others of this genus, those which inhabit the clearest and coldest waters are observed to be of the richest colours. It is a fish of great delicacy of flavour, and much esteemed as a food.

SALMARIN TROUT.

Salmo Salmarinus. *S. dorso fulvo maculis luteis, cauda bifurcata. Lin. Syst. Nat. p.* 511. *Art. syn.* 24.
Trout with fulvous back spotted with yellow, and forked tail.
Salmarinus. *Salv. aquat. p.* 101. *Jonst. pisc. p.* 155.

So nearly allied to the *S. Salvelinus* that it seems doubtful whether it ought to be considered as a distinct species: found in cold rivers with a stony channel or bottom in some parts of Italy.

ALPINE TROUT.

Salmo Alpinus. *S. grisco-argenteus, rubro nigroque irroratus, operculis subauratis, dorso olivaceo, pinna dorsali maculata.*
Silvery-grey Trout, with red and black freckles, slightly gilded gill-covers, olivaceous back, and spotted dorsal fin.
Salmo Alpinus. *S. maculis non ocellatis varius, pinna caudali truncata. Bloch. t.* 104.
Gilt Charr? *Penn. Brit. Zool.*

Length about a foot: shape rather broader in proportion than in the two preceding species: colour silvery, with the back strongly tinged with olive-green, and the sides pretty thickly freckled with very minute bright red and blackish specks: scales very small: head rather large: jaws of equal length: gill-covers slightly tinged with gold-colour: fins reddish, except the dorsal, which is pale olive-brown, and marked between the rays with black specks: adipose fin small, and tipped with red: tail nearly even, or but very obscurely subfurcated.

Native of the Alpine lakes and rivers, as well as those of Germany, Sweden, Lapland, &c. It is also found in the English lakes, and particularly in that called Winandermere in Westmoreland. It appears likewise to inhabit the lakes of Ireland, though not particularized by the writers on the natural history of that country. As an article of food it is in equal esteem with the two preceding species, with which it appears to have been confounded by several authors.

CARP TROUT.

Salmo Carpio. *S. argenteus, albo-maculatus, iridibus albis, pinnis inferioribus nigricantibus.*

Silvery Trout, with white spots, white irides, and dusky lower fins.

Salmo Carpio. *S. pede minor, dentium ordinibus quinque palati. Lin. Syst. Nat. p.* 510. *Art. gen.* 13. *syn.* 24.

Resembles the S. Alpinus, but is of considerably smaller size; scarcely ever arriving at the length of twelve inches: colour silvery, speckled with white on the sides: back marked with black spots: scales very small: pectoral, ventral, and caudal fins dusky, with a slight reddish cast: palate furnished with five rows of teeth: on each side the lower jaw eight specks or points.

This species seems rather obscure: in the Gmelinian edition of the Systema Naturæ no figure is quoted. In some points it seems to agree with the Carpio Lacus Benaci of Rondeletius and Willughby.

LEPECHIN'S TROUT.

Salmo Lepechini. *S. dorso fusco, lateribus ocellis parvis nigris rubro cinctis, ventre luteo.*

Trout with brown back, sides marked by small black spots with red margins, and yellow abdomen.

Salmo Lepechini. *S. maxilla superiore parum prominula, dorso fusco, lateribus exiguis ocellis nigris rubedine circumdatis, ventre flammeo.* Lin. Gmel. Lepechin it. 3. p. 229. t. 14. f. 2.

Allied to the Charr, but larger: head large, above greenish and compressed: eyes large, with yellow irides: cheeks silvery: mandibles furnished with strong, sharp teeth; the lower with sixty: dorsal fin dusky, varied with square black spots: the others flame-colour. Native of the Russian and Siberian rivers: flesh red, firm, and agreeable; described by Lepechin.

LAKE SALMON.

Salmo Lacustris. *S. cauda sub-bifurca, maxillis æqualibus, lateribus et capite maculis minutis nigris rubris.* Gron. zooph. p. 362.

Salmon with subbifurcate tail, equal jaws, and sides and head marked by small black and red spots.

Salmo lacustris. *S. cauda bifurca, maculis solum nigris, sulco longitudinali ventris.* Lin. Syst. Nat. p. 510.

Native of the lakes and other fresh waters of Switzerland, Norway, and Siberia: said to grow to a very great size.

UMBLA SALMON.

Salmo Umbla. *S. subolivaceus, ventre argenteo, squamis minutis, cauda furcata.*

Subolivaceous Salmon, with silvery abdomen, very small scales, and forked tail.

Salmo Umbla. *S. lineis lateralibus sursum recurvis, cauda bifurca. Lin. Syst. Nat. p.* 511.

S. immaculatus pinna ani radiis undecim. *Bloch. t.* 101.

General weight about a pound and a half, but sometimes the fish grows to so large a size as to weigh ten, or, according to Dr. Bloch, even fifteen pounds: habit that of a Trout: colour silvery, with the back tinged with olive-brown: scales very small: eyes reddish: lateral line furnished with small processes turning upwards: fins pale olive: tail forked: inhabits the lakes of Switzerland and Italy: flesh tender, turning red when boiled, and esteemed more delicate even than that of the Trout.

SILVERY SALMON.

Salmo Argentinus. *S. subvirescens, vitta utrinque longitudinali argêntea, cauda furcata, lobo inferiore longiore.*

Greenish Salmon, with a longitudinal silvery stripe on each side the body, and forked tail, with the lower lobe longer than the upper.

Salmo tænia longitudinali argentea, pinna ani longissima. *Lin. Gmel. Bloch. t.* 382. *f.* 1.

Length about nine or ten inches: shape somewhat lengthened towards the tail: head small:

mouth small: colour greenish, with silvery abdomen, and a bright silvery band running from head to tail at some distance above the lateral line: fins pale or white: tail forked, with the upper lobe considerably shorter than the lower: at the base of the tail a black, oval, longitudinal spot. Inhabits the South-American rivers, and is esteemed a delicate fish.

ARCTIC SALMON.

Salmo Arcticus. *S. argenteus, punctis lineolisque fuscis per quatuor utrinque series digestis, cauda bifurca. Lin. Gmel. Pall. it.* 3. *p.* 706.

Silvery Salmon, with four rows of black points and streaks on each side the body, and forked tail.

SHAPE not unlike that of a Smelt: length three or four inches: head but very slightly compressed: front flat, with three longitudinal ridges: snout rounded, rather obtuse: jaws of equal length: eyes silvery: inhabits, in great plenty, the stony rivulets running into the Arctic sea.

POOL SALMON.

Salmo Stagnalis. *S. supra fuscescens, infra albus, corpore subtereti, maxilla superiore longiore. Lin. Gmel. p.* 1374. *O. Fabr. Faun. Groenl. p.* 175.

Brownish Salmon, white beneath, with subcylindric body, and upper jaw longer than the lower.

LENGTH about eighteen inches: shape lengthened, tapering towards the tail: unspotted: head large and oblong-ovate, with a sharpish snout: tongue long, and rather obtuse: mandibles denticulated on the edges: teeth large, curved, and very sharp: palate armed with a triple series of close-set teeth: lower fins greenish, with white base: pectoral rather longer than the dorsal: tail subfurcate, large; adipose fin falcated, and rounded at the tip: rays of the dorsal fin about two inches long: flesh white. Inhabits the waters of the mountains of Greenland.

RIVULET SALMON.

Salmo Rivalis. *S. elongatus fuscus, ventre rubente, capite obtuso. Lin. Gmel. O. Fabr. Faun. Groenl. p.* 176.

Elongated brown Salmon, with reddish abdomen, and obtuse head.

A SMALL species; allied to the S. Carpio, but smaller, hardly growing to the length of six inches: body smooth, mucous, covered with very small scales, and speckled with black: beneath reddish: irides flame-coloured: feeds on insects. Inhabits the smaller rivers and pools of Greenland, in which it is very common.

STROEMIAN SALMON.

Salmo Stroemii. *S. pinnis dorsalibus et ventralibus margine albis. Lin. Gmel. Ström. Sondmör.* 1. *p.* 292.

Salmon with the dorsal and ventral fins edged with white.

Native of Denmark, inhabiting waters with a muddy bottom.

SAURY SALMON.

Salmo Saurus. *S. argenteo-cærulescens, supra fusco transversim undulatus, rictu amplo, cauda bifurca.*

Silvery-blueish Salmon transversely undulated on the upper parts with brown, with wide mouth, and forked tail.

Salmo Saurus. *S. radiis pinnæ ani decem. Lin. Syst. Nat. p.* 511.

Salmo radiis duodecim pinnæ dorsi, undecimque pinnæ ani. *Bloch. t.* 384. *f.* 1.

Shape much elongated: length about twelve inches: colour on the upper parts an elegant greenish blue, varied with pretty numerous, slightly undulated, narrow, brown, transverse bands, reaching as far as the lateral line, which is itself bounded beneath by a continued stripe of brown: abdomen silvery, with a cast of flesh-colour: scales middle-sized: mouth very wide, with large, sharp teeth: eyes rather large, and between them a remarkable depression on the top of the head: fins pale; the dorsal and pectoral crossed by a few brown bars: tail forked. Native of the Mediterranean, American, and Red seas, but considered as a rare species in the Mediterranean.

TUMBIL SALMON.

Salmo Tumbil. *S. flavescens, fasciis transversis semidecurrentibus rubris, rictu amplo, cauda furcata.*

Yellowish Salmon, with semidecurrent transverse red bands, wide mouth, and forked tail.

Salmo Tumbil. *S. ordinibus pluribus dentium tenuium. Bloch. t.* 430.

Of a rather lengthened shape: head taper: mouth very wide, and armed with numerous sharp teeth: lower jaw somewhat longer than the upper: eyes orange-coloured, and seated near the tip of the upper jaw: scales large: fins pale, tinged with dusky blue at their tips: tail forked. Native of the Indian seas, and called by the inhabitants of the Malabar coast by the name of Tumbil: general length about twelve inches.

FETID SALMON.

Salmo Foeteus. *S. argenteo-cærulescens, capite truncato, maxilla inferiore longiore, pinnis rubris, cauda furcata.*

Silvery-blueish Salmon, with truncated head, lower jaws longer than the upper, red fins, and forked tail.

Salmo foeteus. *S. radiis dorsalibus analibusque duodecim. Lin. Syst. Nat. p.* 513.

Salmo capite squamato truncatoque. *Bloch. t.* 384. *f.* 2.

Shape lengthened: head rather large, somewhat truncated in front, and scaly: mouth wide, with the lower jaw longest: both furnished with sharp teeth: eyes large, and near the tip of the upper

jaw: colour silvery, with a blueish tinge on the back: fins reddish; the dorsal crossed by two or three dusky bars. Native of the American seas, and found about the coasts of Carolina: in no great esteem as a food: length about ten or twelve inches: said to have a strong, unpleasant smell. The gill-membrane in this species has only four rays.

SMELT SALMON.

Salmo Eperlanus. *S. argenteus, subcœruleo-virescens, capite diaphano, radiis pinnæ ani septendecim. Lin. Syst. Nat. p.* 511.

Blueish-virescent silvery Salmon, with diaphanous head, and seventeen rays in the anal fin.

Salmo maxilla inferiore longiore, pinna ani radiis septendecim. *Bloch. t.* 28. *f.* 1. 2.

Smelt. *Will. ichth.* 202. *Penn. Brit. Zool.*

Of this species there appears to be two varieties; one not exceeding the length of three or four inches; the other arriving at the general length of six, eight, or nine inches, and sometimes even to twelve or thirteen. The larger variety seems to be that so frequently seen about the British coasts, and which is distinguished by Dr. Bloch under the name of Eperlano-marinus, or Sea-Smelt. These fishes are found about our coasts throughout the whole year, and rarely go to any great distance from the shores, except when they ascend rivers either at or some time before the spawning-season. It is observed by Mr. Pennant that in the river Thames and in the Dee they are taken in great

abundance in November, December, and January; but in other rivers not till February, spawning in the months of March and April.. The Smelt is a very elegant fish: its form beautifully taper: the skin thin, and the whole body, but particularly the head, semitransparent: the colour of the back is whitish, with a cast of green; beneath which it is varied with blue; and then succeeds the beautiful silvery gloss of the abdomen: the scales are small, and easily rubbed off: the eyes are silvery: the under jaw longer than the upper: in front of the upper are four large teeth; those in the sides of the jaws being small: the tail is forked. This fish, which, as before observed, is the largest kind, is an inhabitant of the European seas: it has generally a peculiar odour, which in those of British growth is commonly compared to that of a cucumber, but by some to that of a violet.

VAR.

Salmo Eperlanus *(minor.)*
Eperlanus. *Rondel. Gesn. Aldr. Jonst. &c.*
Eperlan. *Duhamel. tr. des peches. 2. p.* 280.

This, which in every thing except size and odour appears to resemble the former, is said principally to inhabit lakes and rivers, and is rarely taken, except during the spawning-time; generally residing in the muddy bottom; but at that season it enters rivers, and is taken in large shoals: it is a very prolific fish, and is sold in vast quantities in

the northern regions. According to Linnæus, the streets of Upsal, during the sale of this species, are filled with an extremely unpleasant fetid smell.

GREENLAND SALMON.

Salmo Groenlandicus. *S. olivacco-argenteus linea laterali (maris) villosa, cauda furcata.*

Olivaceous-silvery Salmon, with the lateral line (in the male) villous, and forked tail.

Salmo Groenlandicus. *S. cauda latiore ventre. Bloch. t.* 381. *f.* 1.

Clupea villosa. *C. linea laterali prominula, hirta. Lin. Gmel. p.* 1409. *Müll. prodr. zool. dan. p.* 50.

Length about seven inches, which it very rarely exceeds: shape lengthened, contracting somewhat suddenly towards the tail: dorsal fin placed in the middle of the back: fins rather large for the size of the fish: scales small: tail forked: colour pale green, with a tinge of brown above: abdomen and sides silvery: in the male fish, just above the lateral line, is a rough fascia, beset with minute pyramidal scales standing upright like the pile of a shag: the use of this villous line is highly singular, since it is affirmed that while the fish is swimming, and even when thrown on shore, two, three, or even as many as ten will adhere, as if glued together, by means of this pile, insomuch that if one is taken, the rest are also taken up at the same time*. This species swarms off the coasts of Green-

* Penn: Arct: Zool: intr. p. 127.

land, Iceland, and Newfoundland, and is said to be one of the chief supports of the Greenlanders, and a sort of desert at their most delicate repasts. The inhabitants of Iceland are said to dry great quantities of it, in order to serve as a winter food for their cattle, whose flesh is apt to acquire an oily flavour in consequence. This fish lives at sea the greatest part of the year, but in April, May, June, and July, comes in incredible shoals into the bays, where immense multitudes are taken in nets, and afterwards dried on the rocks. When fresh they are by some said to have the smell of a cucumber, though others affirm that the scent is highly unpleasant. They feed on small crabs and other marine insects, as well as on the smaller fuci and confervæ, on which they are also observed to deposit their ova.

GREAT-TOOTHED SALMON.

Salmo Dentex. *S. argenteus, supra fusco albidoque lineatus, pinnis albidis, caudæ dimidio inferiore rubro. Lin. Gmel. p.* 1384. *Forsk. Arab. p.* 66.

Silvery Salmon, lineated above with brown and whitish, with white fins, and lower half of the tail red.

Cyprinus Dentex. *C. pinna ani radiis viginti sex, ore dentibus undique molaribus. Lin. Syst. Nat. p.* 531.

Mentioned by Forskal in his Fauna Arabica: chiefly distinguished by its very large, subulate exserted teeth, in which it differs from the rest of the Salmon tribe: gill-membrane furnished with only four rays. Inhabits the Nile, and is also found in Siberia.

GIBBOUS SALMON.

Salmo Gibbosus. *S. dorso compresso gibboso, pinna ani radiis quinquaginta. Lin. Gmel. p.* 1385.

Salmon with gibbous compressed back, and fifty rays in the anal fin.

Charax dorso admodum prominulo, pinna ani radiis quinquaginta-quinque. *Gronov. mus.* 1. *n.* 53.

INHABITS Surinam: gill-membrane four-rayed.

MARKED SALMON.

Salmo Notatus. *S. macula utrinque nigra versus opercula. Lin. Gmel. p.* 1385.

Salmon with a black spot on each side towards the gill-covers.

SHAPE oblong; marked with a black spot above the lateral line: gill-membrane four-rayed: allied to the S. bimaculatus.

BIMACULATED SALMON.

Salmo Bimaculatus. *S. griseo-argenteus, dorso subfusco, macula utrinque nigra versus opercula et ad basin caudæ furcatæ.*

Silvery-grey Salmon, with a black spot on each side towards the gill-covers and at the base of the forked tail.

Salmo bimaculatus. *S. corpore compresso bimaculato, pinna ani radiis triginta-duobus. Lin. Syst. Nat. p.* 513.

Salmo maculis duabus rotundis nigris. *Bloch. t.* 382. *f.* 2.

LENGTH six inches: shape broad-ovate, tapering towards the tail: head and mouth small: gill-

membrane four-rayed: scales middle-sized: colour yellowish, tinged with brown on the back: abdomen silvery: dorsal, pectoral, and ventral fins pale yellow: adipose fin, anal, and caudal brown: on each side the body, a little beyond the gills, an oval black spot, and a second at the base of the tail. Inhabits the rivers of Amboina, and those of South-America, and is in considerable esteem as a food.

UNSPOTTED SALMON.

Salmo Immaculatus. *S. corpore immaculato, pinna ani radiis duodecim. Lin. Syst. Nat. p.* 513.

Salmon with unspotted body, and twelve rays in the anal fin.

NATIVE of the American seas: gill-membrane four-rayed.

CYPRINOID SALMON.

Salmo Cyprinoides. *S. niveus, pinnæ dorsalis radiis anticis elongato-setaccis. Lin. Syst. Nat. p.* 514.

Snow-white Salmon, with the first rays of the dorsal fin setaceous and elongated.

HABIT of the Cyprinus rutilus, but of a snow-white colour: head flattened above: eyes protuberant: tail forked: gill-membrane four-rayed.

NILOTIC SALMON.

Salmo Niloticus. *S. pinnis omnibus flavescentibus, corpore toto albo. Lin. Syst. Nat. p.* 514.
White Salmon, with all the fins yellowish.

INHABITS the Nile: tail forked: gill-membrane four-rayed.

EGYPTIAN SALMON.

Salmo Ægyptius. *S. dorso virescente, dentibus maxillæ inferioris majoribus. Lin. Gmel. Forsk. Arab.*
Salmon with greenish back, and the teeth of the lower jaw larger than the rest.

NATIVE of Egypt, where it is called *Nefosch*: it is mentioned by Hasselquist under the name of S. Niloticus: the tail is scaly at the base: gill-membrane four-rayed.

DUSTY SALMON.

Salmo Pulverulentus. *S. pinnis subpulverulentis, linea laterali descendente. Lin. Syst. Nat. p.* 514.
Salmon with the fins of a dusty aspect, and descending lateral line.

NATIVE of America: gill-membrane four-rayed.

FLAT-NOSED SALMON.

Salmo Anastomus. *S. ore simo. Lin. Syst. Nat. p.* 514.
Salmon with flattened nose.
Anastomus. *Gronov. mus.* 2. *n.* 165. *t.* 7.

Native of the South-American and Indian seas: gill-membrane four-rayed.

RHOMBIC SALMON.

Salmo Rhombeus. *S. rufescens, abdomine argenteo serrato, cauda nigro marginata.*
Rufescent Salmon, with silvery serrated abdomen, and tail edged with black.
Salmo rhombeus. *S. abdomine serrato, pinna anali caudalique basi margineque nigris. Lin. Syst. Nat. p.* 514.
Salmo abdomine serrato. *Bloch. t.* 383.

Habit broad, not unlike that of the Chætodons: colour dusky red above, and marked with a few small, scattered dusky spots: sides and abdomen silvery: mouth moderate: teeth strong, especially those in the lower jaw: gill-membrane four-rayed: abdomen strongly carinated, and serrated by a series of aculeated processes: scales small: fins yellowish at the base, and dusky at their tips: tail lunated, and terminated by a black border: immediately before the dorsal fin stands a small but strong trifid spine, one point directed forwards, and the other two backwards; and before the anal fin, which is scaly at the base, is a smaller spine of nearly similar structure: native of the rivers of

Surinam, where it is said to arrive at a very considerable size, and to be of a very voracious nature, sometimes attacking ducks, which happen to be swimming on the river: it is much esteemed as a food, the flesh being white, firm, and delicate.

SHARP-BELLIED SALMON.

Salmo Gasteropelecus. *S. argenteus, compressus, minimus, abdomine prominente.*

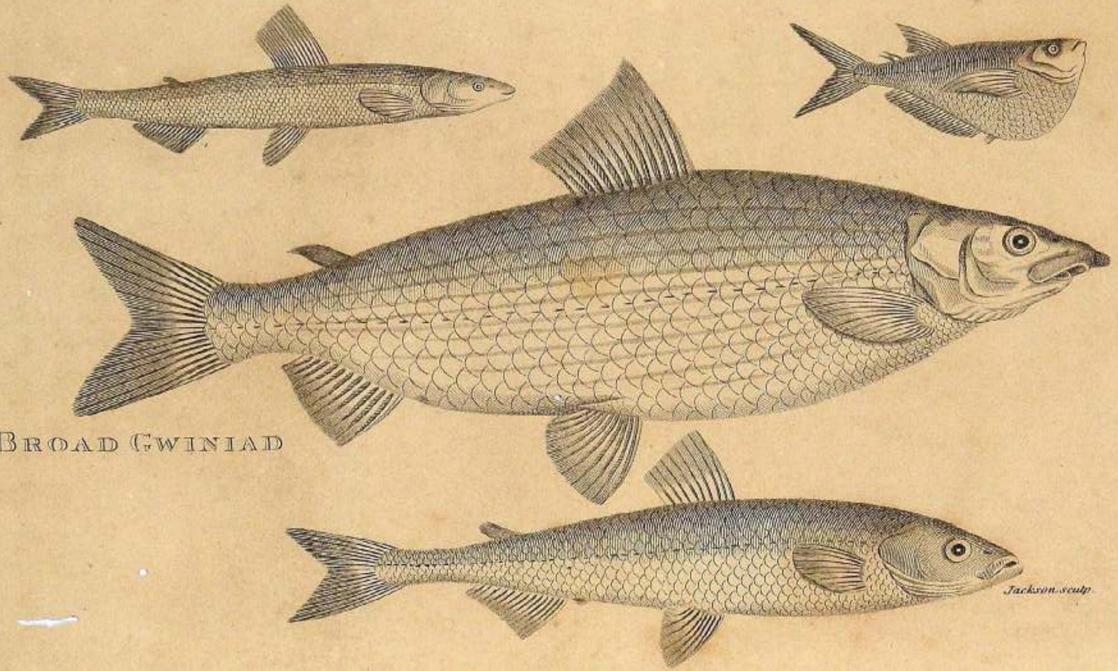
Silvery, compressed, very small Salmon, with projecting abdomen.

Salmo Gasteropelecus. *S. pinnis ventralibus & adiposa minimis. Lin. Syst. Nat. Gmel. p.* 1384.

Clupea Sterniclus. *Lin. Syst. Nat. p.* 524.

Gasteropelecus Sternicla. *Bloch. t.* 97.

An extremely small species; of a very broad, compressed form, with the abdomen sharply carinated beneath: colour silvery: back tinged with pale blue: fins grey: pectoral ones very long, and falcated: tail forked: inhabits the waters of India, Amboina, and South-America: found also in Carolina: said to swim very swiftly. This little fish is made a distinct genus by Gronovius, under the title of *Gasteropelecus*. In the gill-membrane are only four rays.



LAKE SMELT

SHARP-BELLIED SALMON

BROAD GWINIAD

MARÆNULA SALMON

Jackson sculp.

1804. May 10. London Publish'd by G. Kearsley Fleet Street.

FALCATED SALMON.

Salmo Falcatus. *S. argenteo-cærulescens, dorso pinnisque subfuscis, macula utrinque nigra ad opercula & basin caudæ.*

Silvery-blueish Salmon, with brownish back and fins, and a black spot on each side near the gill-covers and at the base of the tail.

Salmo falcatus. *S. bimaculatus, radiis viginti-sex in pinna ani falcata. Bloch. t.* 385.

Length twelve or fourteen inches: shape like that of a common Salmon, but with a distant resemblance to a Pike: mouth wide: laminæ of the upper jaw serrated on the edge: colour of the whole fish silvery, with a blueish tinge on the sides, deepening into brown on the back: scales middle-sized: beyond the gill-covers, immediately above the lateral line, a round black spot, and a similar one at the base of the tail, which is forked: pectoral fins lanceolate: first dorsal situated low on the back: anal falcated, and rather wide: ventral rather small. Native of Surinam.

FASCIATED SALMON.

Salmo Fasciatus. *S. flavus, fusco transversim fasciatus, cauda furcata.*

Yellowish Salmon, with transverse brown bands, and forked tail.

Salmo fasciatus. *S. corpore fasciato. Bloch. t.* 379.

Length about a foot: colour pale yellow, deepening on the back into a dull brownish orange-colour:

whole body crossed by several transverse dusky or blackish bands, some of which are divided at the back and abdomen: scales large: dorsal, anal, and caudal fins dusky: pectoral and ventral pale: dorsal fin and tail each obscurely crossed by a blackish band: tail forked: native of Surinam.

FRIDERICIAN SALMON.

Salmo Friderici. *S. flavus, dorso rubro, corpore utrinque maculis tribus nigris, cauda furcata.*

Yellow Salmon, with red back, and body marked on each side with three black spots.

Salmo Friderici. *S. trimaculatus, basi pinnæ ani squamata. Bloch. t.* 378.

An elegant species: length twelve inches: colour silvery yellow, deepening into dull crimson on the top of the head and back: snout obtuse: scales large: on each side the body three rather large black spots, the first of which is situated near the middle, the second at some distance beyond, and the third at the base of the tail, which is forked: fins pale. Native of Surinam. This species takes its specific name from Mr. Friderici, governor of Surinam, by whom it was communicated to Dr. Bloch: it is much esteemed for the table.

SINGLE-SPOTTED SALMON.

Salmo Unimaculatus. *S. argenteo-cærulescens, macula utrinque nigra, cauda elongata furcata.*

Silvery-blueish Salmon, with a black spot on each side the body, and lengthened forked tail.

Salmo unimaculatus. *S. maxilla superiore sublongiore, macula nigra ad lineam lateralem.* *Bloch. t.* 381. *f.* 3.

Curimata Brasiliensibus. *Marcgr. Pisc.* *Will. &c.*

LENGTH about eighteen inches: colour silvery, with an olive or dusky tinge on the back: fins pale: tail rather long, and very deeply forked: scales rather large than small: on each side the middle of the body a moderately large round black spot: snout obtuse: upper jaw rather longer than the lower. Native of the lakes and other fresh waters of South-America: considered as a very delicate fish by the inhabitants of Brasil, Surinam, &c.

BLACK-TAILED SALMON.

Salmo Melanurus. *S. argenteo-cærulescens, squamis magnis, pinnis flavis, cauda furcata medio nigra.*

Silvery-blueish Salmon, with large scales, yellow fins, and forked tail black in the middle.

Salmo melanurus. *S. radiis triginta in pinna annali, maculaque nigra in caudali.* *Bloch. t.* 381. *f.* 2.

LENGTH of the specimen described by Bloch about four inches: colour silvery, with a blueish cast; the back brown: snout obtuse, with the lower jaw rather longer than the upper: scales

large: fins white: tail forked, and marked by a longitudinal black patch in the middle: native of the South-American seas.

FULVOUS SALMON.

Salmo Fulvus. *S. fulvus, dorso pinnisque fuscis, cauda furcata.*
Fulvous Salmon, with brown back and fins, and forked tail.
Salmo Ode. *S. pinnis nigro-fuscis. Bloch. t.* 386.

Habit like that of a Pike: length from two to three feet: colour orange or fulvous, deepening into brown on the back and fins: dorsal fin spotted with black: lower fins darker than the upper: tail forked: scales large: lateral line nearer the belly than the back: inhabits the African seas, and is a very predacious fish: the flesh is of a reddish colour, and much esteemed by the inhabitants of Guinea.

With inconspicuous teeth.

MIGRATORY SALMON.

Salmo Migratorius. *S. griseo-argenteus, maxillis subæqualibus, pinna dorsi radiis duodecim.*
Silvery-grey Salmon, with nearly equal jaws, and twelve rays in the dorsal fin.
Salmo migratorius. *S. maxillis subæqualibus, pinna dorsi radiis duodecim. Lin. Gmel. Georg. it. p.* 182.

Length from one to two feet: body rather compressed, silvery, grey above: head compressed: irides orange: mouth toothless: snout subconic:

upper lip grey: lower reddish-white: inhabits Lake Baikal in Siberia, out of which it migrates at the spawning season up the rivers: flesh white: eggs yellow: in considerable esteem as a food.

AUTUMNAL SALMON.

Salmo Autumnalis. *S. argenteus, maxilla inferiore longiore, radiis pinnæ dorsi undecim.*

Silvery Salmon, with the lower jaw longer than the upper, and eleven rays in the dorsal fin.

Salmo autumnalis. *S. maxilla inferiore longiore, radiis pinnæ dorsi undecim. Lin. Gmel. Pall. it.* 3. *p.* 705.

Length near a foot and a half: body plump, but compressed, with the back very slightly angulated: scales large and silvery: irides pale gold-colour: mouth toothless: tail forked: inhabits the frozen sea, out of which it ascends the rivers of Patzora and Jenesei, and, by the Angara, into the Lake Baikal; returning in autumn in immense multitudes: dies very soon after being taken out of the water.

WARTMANN'S SALMON.

Salmo Wartmanni. *S. cæruleus, abdomine carneo, pinnis fusco-flaventibus, maxilla superiore truncata.*

Blue Salmon, with flesh-coloured abdomen, yellowish-brown fins, and truncated upper jaw.

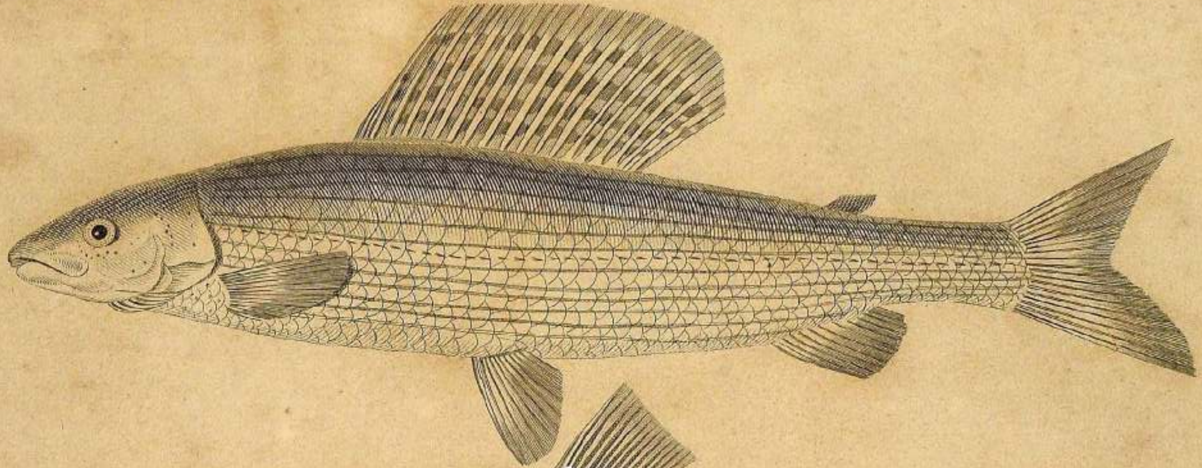
Salmo Wartmanni. *S. cæruleus, maxilla superiore truncata. Lin. Gmel. Bloch. t.* 105.

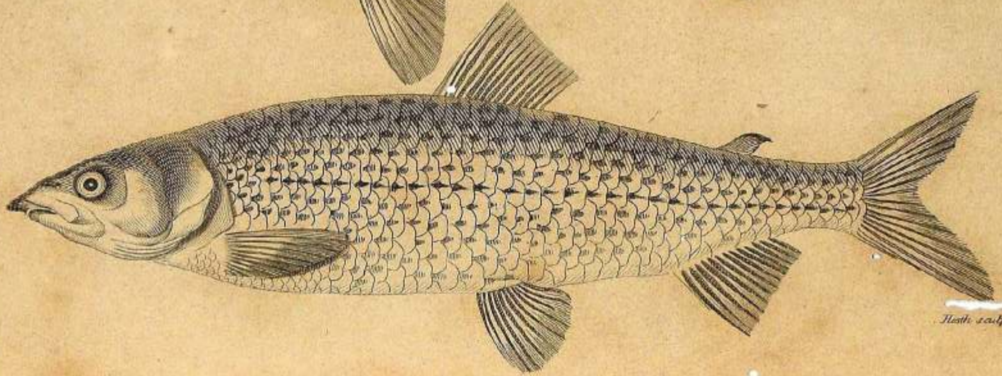
Albula nobilis, Albula cærulea, &c. *Gesn. Aldr. Will. &c.*

Guiniad? *Penn. Brit. Zool.*

General length from twelve to eighteen inches: shape like that of a Salmon, but with smaller and sharper head: colour blue, with a dusky tinge on the back: abdomen silvery: fins pale olive: scales large: lateral line nearly strait, and pretty strongly marked: tail forked, or rather lunated. Inhabits the Alpine lakes of Switzerland, more especially lake Constance, where it is extremely plentiful, and constitutes a very considerable article of commerce among the cantons of Switzerland, as well as other parts of Europe, where it is sent prepared in different ways, and is in considerable esteem as an article of food. Dr. Bloch informs us that this species grows to the length of about two inches in the first year; from three to four in the second; from five to seven in the third; from eight to nine in the fourth, to thirteen in the sixth; and from fourteen to seventeen in the seventh. It generally spawns in the month of December, at which time it seeks out shallows, and afterwards returns into deep water.

GRAYLING SALMON.





Heath sculp.

GWINIAD SALMON.

1804, June 1. London, Published by G. Kearsley, Fleet Street.

GRAYLING SALMON.

Salmo Thymallus. *S. griseus, lineis longitudinalibus fusco-cæruleis, pinna dorsali violacea fusco-fasciata.*

Grey Salmon, with longitudinal dusky blue lines, and violet-coloured dorsal fin barred with brown.

Salmo Thymallus. *S. maxilla superiore longiore, pinna dorsi radiis viginti-tribus. Lin. Syst. Nat. p.* 512.

Salmo pinnæ dorsi radiis viginti-tribus. *Bloch. t.* 24.

Grayling. *Penn. Brit. Zool. Will. icth. Ray. &c.*

This elegant species grows to the length of about eighteen inches, and is an inhabitant of the clearer and colder kind of rivers in many parts of Europe and Asia; particularly such as flow through mountainous countries. In England it is found in the rivers of Derbyshire; in some of those of the North; in the Tame near Ludlow; in the Lug and other streams near Leominster, and in the river near Christchurch in Hampshire*. In Lapland it is said to be very common, where the natives make use of its intestines instead of rennet, in preparing the cheese which they make from the milk of the Rein-Deer.

The shape of the Grayling resembles that of the Trout, but is rather more slender: its colour is a beautiful silvery grey, with numerous longitudinal deeper stripes, disposed according to the rows of scales, which are of a moderately large size: the head, lower fins, and tail, are of a brownish or rufous

* Brit. Zool.

cast: the dorsal fin, which is deeper and broader than in the rest of the genus, is of a pale violet-colour, crossed by several dusky bars: the adipose fin is very small, and the tail forked. The largest English Grayling recorded by Mr. Pennant was taken at Ludlow, and measured above half a yard in length; its weight being four pounds eight ounces: the general size of the British specimens being far short of this measure.

The Grayling, says Mr. Pennant, is a voracious fish, rising freely to the fly, and will very eagerly take a bait: it is a very swift swimmer, disappearing like the transient passage of a shadow, from whence perhaps is derived its ancient name of *Umbra*. It is said to be a fish of very quick growth, feeding on water insects, the smaller kind of testacea, and the roe of other fishes, as well as on the smaller fishes themselves: its stomach is so strong as to feel almost cartilaginous. It spawns in April and May, the full-grown ova being nearly of the size of peas. The Grayling is much esteemed for the delicacy of its flesh, which is white, firm, and of a fine flavour, and is considered as in the highest season in the depth of winter.

GWINIAD SALMON.

Salmo Lavaretus. *S. cærulescens, squamis latis, rostro nasiformi.*
Blueish Salmon, with broad scales, and nose-like snout.
Salmo Lavaretus. *S. maxilla superiore longiore, radiis pinnæ dorsi quatuordecim.* *Lin. Syst. Nat. p.* 512.
Salmo Lavaretus. The Gwiniad. *Bloch. t.* 25.

THIS species is an inhabitant of the lakes of the Alpine parts of Europe. It is found in those of Switzerland, Savoy, and Italy; in Norway, Sweden, and Lapland. In our own island it occurs in Cumberland, and in some parts of Wales. It is also found in the lakes of Ireland. According to Mr. Pennant it is a gregarious fish, approaching the shores in vast multitudes, in spring and summer. A fisherman at Hulse-Water is said to have taken between seven and eight thousand at one draught. In the shape of its body it resembles a Trout, but is thicker in proportion: the head is small, and very taper in front, the upper lip being produced very considerably beyond the lower, in form of a blackish fleshy snout, so that the mouth, which is small, appears placed beneath: the general colour of the fish is a silvery grey, with a dusky tinge on the upper parts, and the base of each scale marked by a dusky speck, particularly along the lateral line: the fins are pale brown, the adipose fin small and sharp, the tail forked, the scales large and of a somewhat dilated form, and the lateral line strait. This fish, according to Dr. Bloch, is not only found in rivers, but in the northern sea and the Baltic;

entering the rivers at the time of spawning, and forcing its way up the most violent streams, generally advancing in two ranges, and forming in front an acute angle, the whole being conducted by a single fish. The largest specimen mentioned by Mr. Pennant weighed between three and four pounds, its general weight being much less, and its length from ten to twelve inches. I must not omit to observe that it may be doubted whether the *Gwiniad* of Mr. Pennant be not rather the S. Wartmanni of Bloch than the present species.

BROAD GWINIAD.

Salmo Rostratus. *S. fusco-cœrulescens, lineis longitudinalibus subfuscis, squamis rotundatis, rostro nasiformi.*

Dusky-blueish Salmon, with longitudinal dusky streaks, rounded scales, and nose-like snout.

Salmo Thymallus latus. *Bloch. t.* 26.

Salmo Lavaretus β. *Lin. Gmel.*

Greatly allied to the preceding in general appearance, so as readily to pass for a variety at most, but is of a larger size, and a somewhat broader shape: the scales are perfectly rounded, without the slight sinking in which takes place on the middle of those of the former species: the mouth is larger and more transverse; and the sides of the body are marked by grey or blueish stripes, which are not visible on the preceding species. The weight of the Broad Gwiniad is from four pounds to four and a half. It is found in the Baltic, and in the rivers of some parts of Germany, Sweden, &c.

SNOUTED SALMON.

Salmo Nasus. *S. latiusculus, capite crasso, maxilla superiore longiore, squamis magnis, pinna dorsali radiis duodecim.*

Broadish Salmon, with thick head, upper jaw longer than the lower, large scales, and twelve-rayed dorsal fin.

Salmo Nasus. *S. maxilla superiore longiore, radiis pinnæ dorsi duodecim, capite crasso. Lin. Gmel. Pall. it. 3. p. 705.*

Length about a foot and a half: habit similar to that of S. Lavaretus, the upper mandible extending beyond the lower, and being gibbous or convex as far as the eyes: scales large: tail forked. Inhabits the channel of the river Oby: observed by Dr. Pallas.

MARÆNA SALMON.

Salmo Maræna. *S. argenteo-cærulescens, squamis magnis, pinnis fuscis, maxilla superiore truncata.*

Silvery-blueish Salmon, with large scales, brown fins, and truncated upper jaw.

Salmo Maræna. *S. maxilla superiore truncata. Lin. Gmel. Bloch. t. 27.*

Length two feet or more: habit that of a Trout: head obtuse, eyes rather large: pupil acutangular on the fore-part: irides silvery: mouth small and without apparent teeth: upper jaw longer than the lower, with two small punctures at the edge: upper lip thick, and as if doubled: colour of the fish bright silvery-grey, with a dusky or blueish tinge on the back: fins blueish: tail forked: scales large and

but slightly fixed: lateral line marked with white specks, and somewhat bent towards the head: native of the Austrian and Helvetian lakes, especially such as have a sandy bottom: a prolific species, and in considerable esteem as a food.

MARÆNULA SALMON.

Salmo Marænula. *S. argenteo-cærulescens, subelongatus, maxilla inferiore longiore, pinna dorsi radiis quatuordecim.*

Silvery-blueish Salmon, with subelongated body, lower jaw longer than the upper, and fourteen rays in the dorsal fin.

Salmo Albula. *Lin. Syst. Nat.*

Salmo Marænula. *Lin. Gmel. Bloch. t.* 28. *f.* 3.

General length about six inches: shape like that of a Trout, but more slender in proportion: colour silvery white, with a tinge of blue on the back: head somewhat taper: lower jaw longer than the upper: scales large: fins pale yellow: tail forked, and blueish towards the tip: lateral line nearly strait: the whole fish has a delicate appearance, and the head, like that of the Smelt, exhibits a degree of transparency. Native of several of the European lakes, viz. those of Germany, Sweden, Denmark, &c. much esteemed for the table, being a very delicate fish, and a very prolific species.

PELED SALMON.

Salmo Peled. *S. edentulus, radiis pinnæ dorsalis decem. Lin. Gmel. Lepechin. it. 3. p. 226.*
Toothless Salmon, with ten-rayed dorsal fin.

LENGTH eighteen inches: body thick: head conic, spotted with black: snout obtuse; lower jaw rather longer than the upper: back blueish: sides and abdomen white: very nearly allied to the S. Albula of Linnæus, and perhaps only a variety. Inhabits rivers in the north of Russia: described by Lepechin.

PIDSCHAN SALMON.

Salmo Pidschan. *S. maxilla superiore longiore, radiis pinnæ dorsi gibbi tredecim. Lin. Gmel. Pall. it. 3. p. 705.*
Salmon with the upper jaw longer than the lower, and thirteen-rayed gibbous dorsal fin.

MUDSCHAN SALMON.

Salmo corpore latiore, pinnæ ani radiis quatuordecim. *Lin. Gmel. Pall. it. 3. p. 705.*
Salmon with broadish body, and fourteen rays in the anal fin.

BOTH the above are so much allied to the S. Lavaretus as to leave it doubtful whether they may not be varieties of that species: the length of each of the above fishes is about two spans: their general

appearance that of the Lavaretus, but rather broader in proportion: mentioned by Dr. Pallas as inhabiting the river Oby.

SCHOKUR SALMON.

Salmo Schokur. *S. maxilla superiore longiore, capite parvo, radiis pinnæ dorsi anterius angulati duodecim. Lin. Gmel. p.* 1378.

Salmon with small head, upper jaw longest, and twelve-rayed dorsal fin angular in front.

This is about two feet in length, and so much allied to the Lavaretus as scarce to differ materially, except in being rather larger and broader, with a more obtuse snout, which is obscurely bituberculated: observed by Dr. Pallas in the river Oby.

MÜLLER'S SALMON.

Salmo Mülleri. *S. maxillis edentulis, inferiore longiore, ventre punctato. Lin. Gmel. Müll. prodr. zool. Dan. p.* 49.

Toothless Salmon, with lower jaw longest, and punctated abdomen.

Native regions unknown.

VIMBA SALMON.

Salmo Vimba. *S. pinna adiposa subserrata. Lin. Gmel. Lin. Faun. Suec. p.* 351.
Salmon with subserrated dorsal fin.

Inhabits the rivers of Sweden: dorsal fin furnished with twelve, pectoral with sixteen, ventral with ten, anal with fourteen rays: mentioned by Linnæus in the Fauna Suecica.

SHARP-SNOUTED SALMON.

Salmo Oxyrhinchus. *S. maxilla superiore longiore conica. Lin. Gmel. p.* 1383.
Salmon with the upper jaw longest and conical.

Found in the Atlantic ocean: in the dorsal fin are thirteen or fourteen rays; in the pectoral from thirteen to seventeen; in the ventral from ten to twelve, and in the anal fourteen or fifteen.

BRIGHT SALMON.

Salmo Leucicthys. *S. maxilla superiore latissima integra recta breviore, inferiore ascendente, apice tuberculosa. Lin. Gmel. Guldenstadt. nov. comm. Petrop.* 16. *p.* 351.
Salmon with very broad strait upper jaw, shorter than the lower, which is ascendent, and tuberculated at the tip.

A rather large species; growing to the length of three feet or more: shape oblong; body rather

compressed, and of a bright silvery grey, spotted with black; of a dusky hue above, and covered with middle-sized scales: eyes large: snout extremely obtuse: mouth toothless, very wide, and square: tongue flat and triangular: dorsal fin pale brown: pectoral acuminated and white: ventral rounded, white, spotted with brown on the fore-part: anal reddish, spotted with brown: tail semilunar. Inhabits the Caspian sea: described by Guldenstadt.

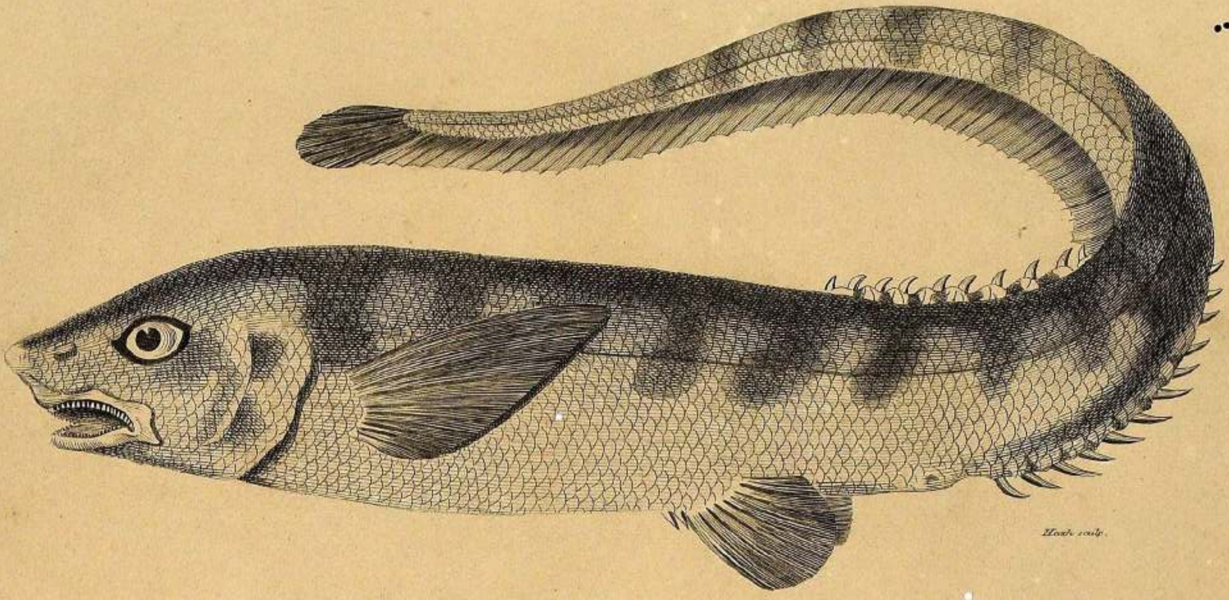
TOOTHLESS SALMON.

Salmo Edentulus. *S. argenteo-olivaceus, capite compresso flavo, pinnis lanceolatis rubris, cauda furcata.*

Silvery-olive Salmon, with compressed yellow head, lanceolate red fins, and forked tail.

Salmo edentulus. *S. oculis magnis, ore edentulo. Bloch. t.* 380.

LENGTH twelve inches: shape like that of a Carp: scales large: colour silvery, with a slight greenish tinge: back olive-brown: head yellowish, sinking in above the eyes, which are very large: snout obtuse: mouth small, and toothless: lateral-line strait: fins of a sharp, subfalcated form, and of an orange-colour: tail large and forked. Native of Surinam, where it is said to be highly esteemed fo· the table.



Heath sculp.

SNOUTED ACANTHONOTUS.

1804 June 1 London Published by G. Kearsley Fleet Street.

ACANTHONOTUS. ACANTHONOTUS.

Generic Character.

Corpus elongatum, sine pinna dorsali.	*Body* elongated, without dorsal fin.
Aculei plures dorsales & abdominales.	*Spines* several, on the back and abdomen.

SNOUTED ACANTHONOTUS.

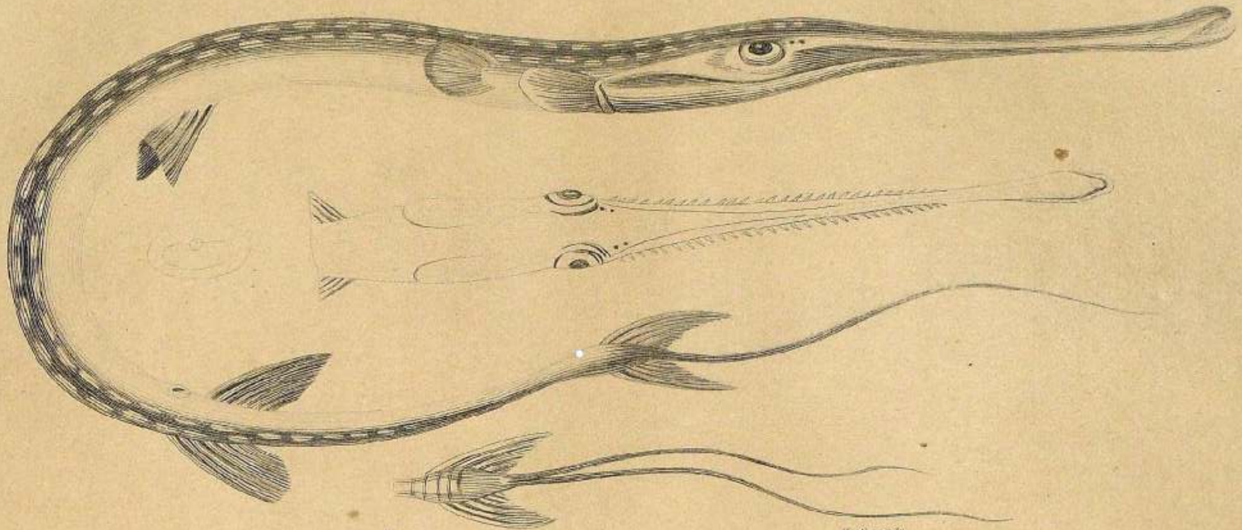
Acanthonotus Nasus. *A. griseus, dorso transversim fusco-fasciato.*

Grey Acanthonotus, with the back transversely barred with brown.

Acanthonotus Nasus. *A. rostro nasiformi. Bloch.* 12. *p.* 113. *t.* 431.

THIS fish grows to a considerable size, the length of the specimen described by Dr. Bloch being two feet and a half: the head is large, the upper part of the snout extending forwards in such a manner as to make the mouth appear as if situated beneath: the teeth are small, forming a row along each jaw: the eyes large, and the nostrils conspicuous: the body, which is of moderate width for about a third of its length, gradually decreases or tapers towards the extremity: both head and body are covered with small scales, and are of a blueish tinge, with a silvery cast on the abdomen,

the back being barred throughout the greatest part of its length by several broad, semidecurrent, brown fasciæ: the pectoral fins are brown, and of moderate size: the ventral rather small, and of similar colour: the lateral line is strait, and situated nearer to the back than to the abdomen: along the lower part of the back are disposed ten strong but short spines, and beneath the abdomen are about twelve or thirteen others, commencing almost immediately beyond the vent: these are followed by the anal fin, which is shallow, and continued into the tail, which is very small. This fish is a native of the East Indies.



Heath sculp.

SLENDER FISTULARIA

1804 June 1 London Published by G. Kearsley Fleet Street.

FISTULARIA. FISTULARIA.

Generic Character.

Rostrum cylindricum, apice maxillosum.	*Snout* cylindric: mouth terminal.
Corpus elongatum.	*Body* lengthened.
Membr: branch: radiis septem.	*Gill-membrane* seven-rayed.

SLENDER FISTULARIA.

Fistularia Tabacaria. *F. cauda bifida setifera. Lin. Syst. Nat. p.* 515.

Fistularia with bifid tail, furnished with a long bristle-shaped process.

Petimbuaba. *Marcgr. Bras. p.* 148. *Piso. Raj. &c.*

The Tobacco-Pipe Fish. *Will. ichth. p.* 233.

Fistularia Tabacaria. *Bloch. t.* 387.

THIS highly singular fish seems to have been first described by Marcgrave in his Natural History of Brasil, under the name of *Petimbuaba.* He informs us that it grows to the length of three or four feet, and is of a shape resembling that of an Eel, with the mouth toothless and pointed, and the upper lip longer than the lower; the head about nine inches long, from the eyes to the tip of the mouth; the eyes are large and ovate, with a bright-blue pupil and silvery iris, marked on the fore and hind part by a red spot; the skin smooth, like that

of an eel, and of a liver-colour, marked both above and on each side by a row of blue spots, with greenish ones intermixed. Marcgrave adds that it is an edible fish, though of no particular delicacy. Dr. Bloch observes that both the jaws are in reality beset with minute teeth; that the tongue is smooth and loose; the body flattened in front but rounded on the back, the lateral line strait, the abdomen silvery, and the fins of a pale red. The appearance of the tail is highly singular, being pretty deeply forked, as in the generality of fishes, while from the middle of the furcature springs a very long and thickish bristle or process, of a substance resembling that of whalebone, and gradually tapering to a fine point. A variety has been observed by Dr. Bloch, in which this part was double, and the snout serrated on each side. This variety, or perhaps sexual difference, appears from the observations of Commerson, detailed by Cepede, to be of a brown colour above, and silvery beneath, but without the blue spots so remarkable on the smooth-snouted kind. The Count de Cepede informs us also that the spine of this fish is of a very peculiar structure; the first vertebra being of immoderate length, the three next much shorter, and the rest gradually decreasing as they approach the tail: he adds that there are no visible ribs.

Dr. Bloch's highly accurate and beautiful figure of this curious fish is repeated in the present work, together with a representation of the remarkable variety above-mentioned, in which the tail-process is double and the snout serrated.

This species is said to live chiefly on the smaller fishes, sea-insects, and worms, which the structure of its snout enables it readily to obtain, by introducing that part into the cavities of rocks, under stones, &c. where those animals are usually found.

CHINESE FISTULARIA.

Fistularia Chinensis. *F. squamosa rufescens, nigro maculata, cauda rotundata mutica.*

Scaly rufescent Fistularia, with black spots and simple rounded tail.

Fistularia Chinensis. *F. cauda rotundata mutica. Lin. Syst. Nat. p.* 515.

Fistularia Chinensis. *F. edentata, cauda rotundata. Bloch. t.* 388.

The Chinese Trumpet-Fish.

Length from three to four feet: general shape like that of an eel, but the body thicker in proportion than in the preceding species: head lengthened into a strong cartilaginous, or rather bony and laterally-compressed, tubular snout, much broader than in the former species: mouth small: eyes rather large: scales of moderate size, strong, and much resembling in their structure those of the genera of *Perca* and *Chætodon:* from the middle of the back to the dorsal fin run several strong, short, and rather distant spines: dorsal and anal fin of similar shape, and placed opposite each other, pretty near the tail, which is short, rounded, and marked by a pair of black stripes: pectoral fins rounded:

ventral small, and placed considerably beyond the middle of the body: general colour pale reddish-brown, with several deep or blackish spots on various parts of the body, and three or four pale or whitish longitudinal stripes on each side, from the gills to the tail: fins pale yellow. Native of the Indian seas, preying on worms, sea-insects, &c. Though observed only in the tropical seas, yet its fossil impressions have been found under the volcanic strata of mount Bolca in the neighbourhood of Verona*.

PARADOXICAL FISTULARIA.

Fistularia Paradoxa. *F. cinereo-flavescens, fusco variata, pinnis pectoralibus ventralibusque magnis, cauda lanceolata.*

Yellowish ash-coloured Fistularia, with brown variegations, large pectoral and ventral fins, and lanceolate tail.

Fistularia paradoxa. *F. lineis argute prominulis reticulata, cauda lanceolata. Lin. Gmel.* 1388. *Pall. spic. zool.* 8. *p.* 32. *t.* 4. *f.* 6.

A SMALL species, described by Seba, and, more accurately, by Dr. Pallas. Length from two to four inches: body angular, and beset at the interstices of the lines with small spines: head small: eyes large, and situated at the base of the snout, which much resembles that of a Syngnathus, and is long, slightly descending, strait, horny, compressed, sharp above, and bicarinated beneath: it is armed on each side, near the base, by a small, conic spine:

* Gazola's Ichthiologie des environs de Verone, *pl.* 5. *f.* 1.

mouth small: nape trimuricated: gill-openings very shallow and small, and radiated by a few prominent lines: first dorsal fin long, and reclining: pectoral fins very broad: ventral very large, with deeply divided rays, and connected longitudinally by a lax saccular membrane: general colour cinereous, or yellowish-white, with obscure brown undulations, which are darker or blackish on the first dorsal fin and tail. Native of the Indian seas, and appears in some degree allied to the *Syngnathi* or *Sea-Needles*, among the *Cartilaginous Fishes*.

ESOX. PIKE.

Generic Character.

Caput supra planiusculum: os amplum.	*Head* somewhat flattened above: mouth wide.
Dentes acuti, in maxillis, palato, lingua.	*Teeth* sharp, in the jaws, palate, and tongue.
Corpus elongatum: pinnæ dorsalis analisque (plerisque) prope caudam, oppositæ.	*Body* lengthened: dorsal and anal fin (in most species) placed near the tail, and opposite each other.

COMMON PIKE.

Esox Lucius. *E. griseo-olivaceus subflavo maculatus, rostro depresso subæquali.*

Greyish-olive Pike, with yellowish spots, and depressed subequal jaws.

Esox Lucius. *E. rostro depresso subæquali. Lin. Syst. Nat. p.* 516.

Lucius. *Rondel. Gesn. &c. &c.*

Esox Lucius. *E. capite compresso, rictu amplo. Bloch. t.* 32.

Pike. *Penn. Brit. Zool.* Pike or Pickerel. *Will. ichth. p.* 236.

TO the general history of this fish perhaps little can be added to what Mr. Pennant has already detailed in the third volume of the British Zoology. It is, says that agreeable writer, a native of most of the lakes and smaller rivers in Europe, but the largest are those of Lapland, which, according to

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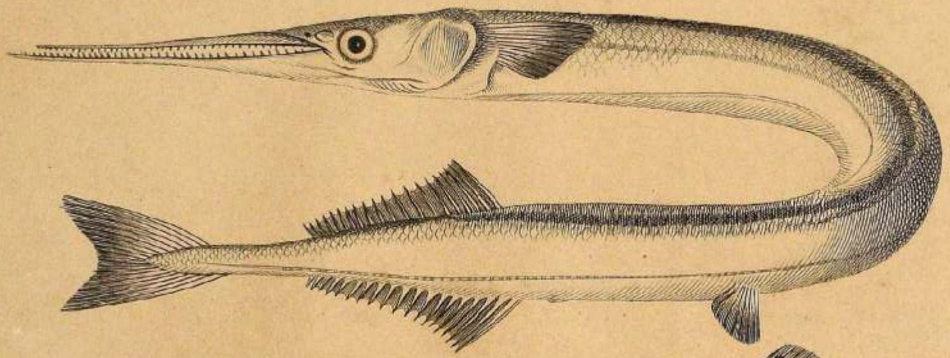
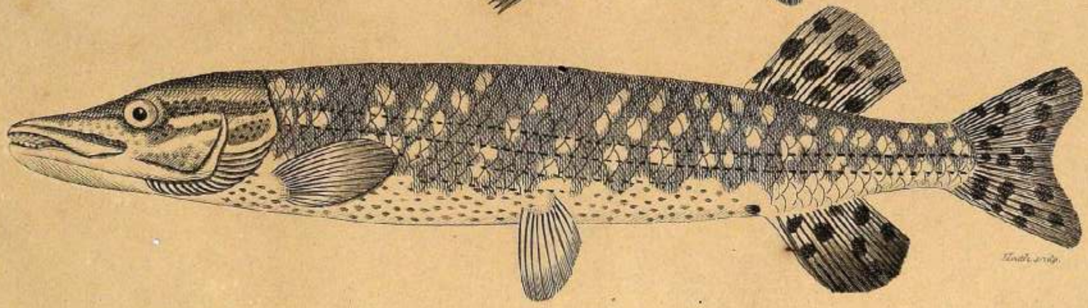
GAR PIKE.





COMMON PIKE.

1804 June 1 London Published by G. Kearsley Fleet Street.

Schæffer, are sometimes eight feet in length: they are taken there in great abundance, dried, and exported for sale. The largest specimen of English growth is said by Mr. Pennant to have weighed thirty-five pounds. The head of the Pike is very flat; the upper jaw broad, and shorter than the lower, which turns up a little at the end, and is marked with minute punctures: the teeth are very sharp, disposed only in front of the upper jaw, but in both sides of the lower, as well as in the roof of the mouth, and often on the tongue: the number, according to Bloch, is not less than seven hundred, without reckoning the farthest of all or those nearest the throat: it is also to be observed that those which are situated on the jaws are alternately fixed and moveable: the gape is very wide, and the eyes small: the dorsal fin is placed very low on the back, and consists of twenty-one rays; the pectoral of fifteen; the ventral of eleven, and the anal of eighteen: the tail is slightly forked, or rather lunated. The usual colour of this fish is a pale olive-grey, deepest on the back, and marked on the sides by several yellowish spots or patches: the abdomen is white, slightly spotted with black. When in its highest perfection however the colours are frequently more brilliant; the sides being of a bright olive, with yellow spots, the back dark green, and the belly silvery. Dr. Bloch assures us that in Holland the Pike is sometimes found of an orange-colour, marked with black spots: the scales are rather small, hard, and of an oblong shape.

The voracity of the Pike is commemorated by all ichthyological authors. Mr. Pennant observes that he himself has known one that was choaked in attempting to swallow one of its own species which proved too large a morsel. It will also devour water-rats, and young ducks which happen to be swimming near it. In a manuscript note to a copy of Plott's History of Staffordshire, and which Mr. Pennant afterwards found was inserted, on good authority, by a Mr. Plott of Oxford, the following highly singular anecdote is recorded. "At Lord Gower's canal at Trentham, a Pike seized the head of a swan as she was feeding under water, and gorged so much of it as killed them both: the servants, perceiving the swan with its head under water for a longer time than usual, took boat, and found both swan and pike dead." But there are instances, says Mr. Pennant, still more surprising, and which indeed border a little on the marvellous. Gesner relates that a famished Pike in the Rhone, seized on the lips of a mule that was brought to water, and that the beast drew the fish out before it could disengage itself: he adds that people have been bitten by these voracious animals while they were washing their legs, and that they will even contend with the Otter for its prey, and endeavour to force it out of his mouth.

The smaller kind of fishes are said to shew the same uneasiness and detestation at the presence of a Pike as the smaller birds do at the sight of a hawk or an owl, and when the Pike, as is often the case, lies dormant near the surface of the water, are ob-

served to swim around in vast numbers, and in the greatest anxiety. In the ditches near the Thames Pike are often haltered in a noose, and taken while they lie thus asleep, as they are frequently found in the month of May.

The longevity of the Pike is very remarkable, if, as Mr. Pennant observes, we may credit the accounts given by authors. *Rzaczynski* in his Natural History of Poland tells us of one that was ninety years old; but Gesner relates that in the year 1497, a Pike was taken near Hailburn in Suabia, with a brazen ring affixed to it, on which were these words in Greek characters. "I am the fish which was first of all put into this lake by the hands of the Governor of the Universe Frederick the second, the fifth of October 1230," so that, adds Mr. Pennant, the former must have been an infant to this *Mathusalem* of a fish.

The Pike spawns in March and April, according to the warmth or coldness of the season; depositing its ova among the weeds, &c. near the water's edge: the young are said to be of very quick growth: indeed Bloch considers it as the quickest grower of all the European fishes whose progress he has had an opportunity of observing. The first year, according to this author, it arrives at the length of from six to ten inches; the second to twelve or fourteen; and the third to eighteen or twenty. The stomach of the Pike is strong and muscular and of very considerable length: it is also furnished with several large and red pleats: in the intestinal canal have been observed several kinds of worms

and particularly tæniæ, of which not fewer than an hundred have been seen in a single fish.

The Pike is generally supposed to have been introduced into England in the reign of King Henry the eighth, and it is said that they were then so rare that a Pike was sold for double the price of a house-lamb in February, and a Pickrel or Jack for more than a fat capon: yet as it occurs in the famous inthronization feast of Archbishop Nevil in the year 1466, it was probably known in our island at a much earlier period.

SEA PIKE.

Esox Sphyræna. *E. argenteo-cærulescens dorso dipterygio, maxilla inferiore longiore, pinnis inferioribus rubentibus.*

Silvery-blueish Pike, with two dorsal fins, lower jaw longer than the upper, and lower fins reddish.

Esox Sphyræna. *E. dorso dipterygio, antica spinosa. Lin. Syst. Nat. p.* 515.

Esox pinnis dorsi duabus. *Bloch. t.* 339.

Sphyræna. *Salv. Aldr. Will. Jonst. &c. &c.*

Sea Pike, or Spit-Fish. *Charlt. onomast. p.* 136.

This species in its general habit or appearance is considerably allied to the common Pike, but is of a silvery blueish colour, dusky on the back, and slightly tinged with yellow on the head and about the gills: the first dorsal fin is situated on the middle of the back, and is furnished with only four rays, which are all strong or spiny: the second, which is placed opposite the anal fin, consists of about ten rays, of which the first only is spiny:

both these dorsal fins, together with the tail, which is deeply forked, are of a dusky tinge: the pectoral, ventral, and anal are of a pale red: the eyes are moderately large; the lower jaw longer than the upper; the scales middle-sized, and the lateral line nearly strait. This fish is an inhabitant of the Mediterranean and Atlantic seas; growing to the length of about two feet. It is said to be in considerable esteem for the table, the flesh resembling that of the Cod-Fish.

BARRACUDA PIKE.

Esox Barracuda. *E. elongatus fuscus, subtus albidus, dorso dipterygio, cauda furcata.*

Brown, elongated Pike, whitish beneath, with two dorsal fins, and forked tail.

Barracuda. *Catesb. Carol.* 2. *t.* 1.

Habit of the common Pike, but of a longer form, and more slender or taper in proportion towards the tail: size very great, some having been seen of ten feet in length; but the more common size, according to Catesby, is from six to eight feet: eyes large; mouth very wide, with the under jaw longer than the upper, which is armed with four large teeth placed at the fore-part of the jaw: next the head are placed ten smaller teeth, being five on each side; and in the fore-part of the under jaw grows a large single tooth: the dorsal fins are two in number; the first situated on the middle of the

back, and the second towards the tail, opposite the anal fin: the tail is pretty deeply forked: general colour brown, with whitish abdomen. This is said to be an extremely strong, fierce, and dangerous fish, swimming with great rapidity, and preying on most others: it is even said sometimes to attack and destroy bathers, in the same manner as the Shark. It is found in great plenty in the tropical seas, and is frequent about the West-Indian islands. It is in no estimation as a food, the flesh being rank, and even, sometimes, according to common report, highly noxious, occasioning all the symptoms of the most fatal poisons; yet, in spite of these bad qualities, we are assured by Catesby that the hungry Bahamians frequently make their repast "on its unwholesome carcase." The situation of the teeth of this fish, as described by Catesby, seems rather anomalous, and I know not whether it may be considered as sufficiently correct or not.

FOX PIKE.

Esox Vulpes. *E. fuscus, pinna in medio dorsi, membrana branchiostega triradiata. Lin. Syst. Nat. p.* 516.

Brown Pike, with dorsal fin in the middle of the back, and three-rayed gill-membrane.

Vulpes Bahamensis. *Catesb. Car.* 2. *t.* 1. *f.* 2.

General length about sixteen inches: habit somewhat similar to that of a common Pike, but remarkably slender or taper towards the tail, which is very deeply and widely forked: mouth of mode-

rate width: jaws equal, and with a single row of sharp teeth in each: dorsal fin situated in the middle of the back: scales rather large, thin, and rounded: colour of the whole fish brown, paler or lighter beneath: native of Carolina and the West-Indian islands.

MALABAR PIKE.

Esox Malabaricus. *E. subflavescens, pinna in medio dorsi, pinnis fusco transversim fasciato-maculatis, cauda rotundata.*

Yellowish Pike, with dorsal fin on the middle of the back, fins transversely barred with brown spots, and forked tail.

Esox Malabaricus. *E. dentibus caninis quatuor, radiis quinque membranæ branchiostegæ. Bloch. t.* 392.

Length of the specimen described about twelve inches: habit distantly allied to that of the common Pike, but with the tail rounded, and the dorsal fin placed on the middle of the back: colour yellowish, dusky on the back: lower jaw longer than the upper: eyes rather large: scales large, and very distinct: lateral line bending a little downwards at its origin from the gill-covers, and then running strait to the tail: all the fins, together with the tail, of a very pale, transparent brown, barred by several rows of deep-brown spots. Native of Malabar, inhabiting rivers and rivulets, and in considerable esteem for the table.

WEST-INDIAN PIKE.

Esox Synodus. *E. pinna in medio dorsi, membrana branchiostega quinqueradiata. Lin. Syst. Nat. p.* 516.
Pike with the dorsal fin on the middle of the back, and five-rayed gill-membrane.

GREATLY allied to the E. Vulpes. Native of the American seas, and according to Cepede sometimes found in the Mediterranean: body marked by a few transverse dusky bands: scales large: abdomen silvery: fins striped with black.

SILVER-STRIPE PIKE.

Esox Hepsetus. *E. linea laterali argentea. Lin. Syst. Nat. p.* 517. *Piquitinga. Marcgr. Bras. p.* 159.
Pike with silvery lateral line.
Esox marginatus. *E. pinna dorsali anique oppositis, linea laterali argentea, maxilla inferiori sextuplo longiori. Lin. Gmel. p.* 1393. *Forsk. Arab. p.* 67.

A SMALL species: body elongated, somewhat transparent, and covered with rather large scales: tail bilobate, and scaled like the body: upper jaw short; lower six times as long, and rather soft at the tip: general colour brownish above, and whitish beneath. Native of the Indian and American seas.

SILVER PIKE.

Esox Argenteus. *E. fuscus, litteris flavicantibus pictus. Lin. Gmel. G. Forst. it. circa orb.* 1. *p.* 159.
Dusky Pike, variegated with yellowish characters.

NATIVE of New Zealand and other islands in the Southern Ocean, inhabiting fresh waters.

NAKED-HEADED PIKE.

Esox Gymnocephalus. *E. maxillis æqualibus, operculis obtusissimis, capite denudato. Lin. Syst. Nat. p.* 517.
Pike with naked jaws, very obtuse gill-covers, and naked head.

NATIVE of India: said by Linnæus to be of the size of a Launce.

BRASILIAN PIKE.

Esox Brasiliensis. *E. maxilla inferiore longissima, corpore serpentino. Lin. Syst. Nat. p.* 517.
Pike with snake-shaped body, and very long under jaw.
Esox Brasiliensis. *Bloch. t.* 391.

LENGTH about twelve or fifteen inches: body long and subcylindric: scales rather large: colour pale green, with five or six broad, semidecurrent, brown bands across the back: abdomen silvery: head formed in such a manner as to resemble that of a Swordfish inverted; the lower jaw being semicylindric, and vastly longer than the upper: both

are edged with small sharp teeth: eyes large: fins pale: tail sharply forked, with the lower lobe rather longer than the upper. Native of the Indian and American seas: considered as an excellent fish for the table, according to some.

SPUR-FINNED PIKE.

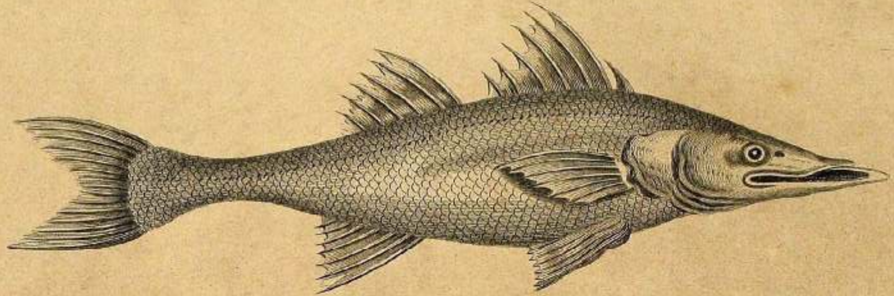
Esox Chirocentrus. *E. maxilla inferiore longiore, spina utrinque thoracica super pinnas pectorales.*

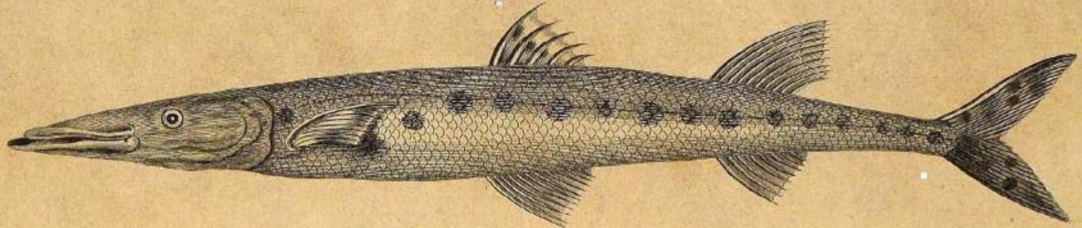
Pike with the lower jaw longer than the upper, and the breast armed on each side by a spine over the pectoral fin.

Esox Chirocentrus. *Cepede. 5. p.* 317.

Slightly described, and figured by Cepede from the manuscripts of Commerson: habit like that of the common Pike: lower jaw longer than the upper but rounded at the tip: teeth sharp and rather large in both jaws: scales middle-sized: dorsal fin single, and placed opposite the anal: on each side the thorax, immediately over the pectoral fin, a very strong and slightly curved spine about two thirds the length of the fin, and of which it appears to be in reality no other than a kind of first ray standing separate from the fin itself: tail forked. Native of the Indian seas.

GOLD-GREEN PIKE.





Jackson sculp.

BECUNA PIKE.

1804 May 1. London Published by G. Kearsley Fleet Street.

CHINESE PIKE.

Esox Chinensis. *E. capite gracili, maxilla inferiore longiore, oculis magnis prominulis.*

Pike with slender head, lower jaw longer than the upper, and large protuberant eyes.

Sphyræna Chinensis. *Cepede. 5. p.* 327.

Slightly described by Cepede from the MSS. of Commerson; scales middle sized: native of the Indian seas: general colour green with a cast of silver.

GOLD-GREEN PIKE.

Esox Aureoviridis. *E. aureo-viridis, pinnis dorsalibus duabus, ore acuto, maxilla inferiore longiore.*

Gold-green Pike, with two dorsal fins, and sharp-pointed mouth with the lower jaw longer than the upper.

Sphyræna aureo-viridis. *Cepede. 5. p.* 329.

An elegant species, according to Cepede, who describes and figures it from the drawings of Plumier. Habit resembling some of the Spari: head pointed: colour as expressed in the specific character: scales middle-sized: at the base of the first dorsal fin a somewhat strong spine: tail forked or lunated. Native of the American seas.

BECUNA PIKE.

Esox Becuna. *E. elongatus, argenteo-cærulescens, corpore utrinque cæruleo maculato pinnis dorsalibus duabus, cauda furcata.*

Silvery-blueish Pike, marked on each side by a row of deep-blue spots, with two dorsal fins, and forked tail.

Sphyræna Becuna. *Cepede.* 5. *p.* 329.

Described by Cepede from the drawing of Plumier: shape considerably elongated: head slender, with lower jaw longer than the upper: scales middle-sized: general colour silver-blue, with a series of pretty large, round, dark-blue spots along each side the body, tail spotted with blue. Native of the American seas.

GAR PIKE.

Esox Belone. *E. anguilliformis viridi-cæruleus, abdomine argenteo, maxillis subulatis.*

Eel-shaped Pike, blue-green above, with silvery abdomen, and very long, taper jaws.

Esox Belone. *E. rostro utraque maxilla subulato. Lin. Syst. Nat. p.* 517.

Esox Belone. *E. rostro subulato. Bloch. t.* 33.

Gar Pike. *Penn. Brit. Zool.*

To the history of this fish little can be added to what has already been detailed by Mr. Pennant in the third volume of the British Zoology. It is a native of the European seas, and arrives in shoals on the British coasts towards the beginning of summer, preceding the Mackrel. Its general

length is from two to three feet; sometimes more: the jaws are very long, slender, and sharp-pointed; the lower extending much farther than the upper, and the edges of both armed with numerous, short, slender teeth: the inside of the mouth is purple: the tongue small: the eyes large, with silvery irides: the body is slender, and the belly flat, bounded on both sides by a rough line: the colours of the living fish are extremely beautiful; the back being of a very fine green, beneath which is a rich changeable blue and purple cast, while the sides and belly are of a bright silver-colour: the pectoral fins consist of fourteen rays, the ventral, which is small, and very remote from the head, of seven, the first of which is spiny: the dorsal and anal fins are situated near the tail, and grow gradually shallower as they approach that part, which is pretty deeply forked. This fish is in considerable esteem as a food, but is rarely admitted to superior tables, on account of a prejudice entertained against the appearance of the spine, and bones, which acquire a green colour by boiling.

SAURY PIKE.

Esox Saurus. *E. anguilliformis subfuscus, abdomine argenteo, maxillis subulatis æqualibus, pinna dorsali analique in pinnulas versus caudam continuatis.*

Brownish Eel-shaped Pike, with silvery abdomen, slender tapering jaws of equal length, and the dorsal and anal fin continued into pinnules towards the tail.

Saurus. *Rondel. pisc. p.* 232.

Saury Pike. *Penn. Brit. Zool.*

The Saury Pike may be considered as a comparatively rare species, and seems to have been first described by Rondeletius, who mentions it among the Mediterranean fishes, under the title of *Saurus*. Its general length is about a foot: the body eel-shaped, growing suddenly taper as it approaches the tail: the snout is about an inch long, slender, and with the jaws produced, like those of the Gar, but both of equal length, and the upper mandible is a little incurvated: the pectoral fins are small; the ventral still smaller: the dorsal and anal shallow, situated near the tail, and are each continued into the appearance of six or seven finlets above and below, like those in the genus Scomber, as far as the base of the tail, which is deeply forked. The colour of the whole animal is dusky above, and silvery beneath; or with equal propriety, it might be said to be silvery, with dusky or blueish-brown back. According to Rondeletius it resembles the Mackrel in taste, being in that respect much allied to the Gar. Mr. Pennant in-

forms us that in the month of November 1768, great numbers of this species were thrown by a storm on the shores of Leith near Edinburgh. In an elegant drawing of this fish, communicated by the Rev[d]. Mr. Rackett, F.L.S. I observe that the skin appears reticulated by fine lines, decussating each other at equal distances; and that the tail is obliquely streaked by several transverse dusky lines.

In a specimen figured in the work of Cepede the jaws are represented curving upwards, contrary to what has hitherto been observed; the specimen figured in the work of Mr. Pennant, as well as that in Rondeletius, and the last mentioned drawing by Mr. Rackett having the jaws strait.

BONY-SCALED PIKE.

Esox Osseus. *E. virescens, abdomine subroseo, squamis quadratis osseis, rostro prælongo.*

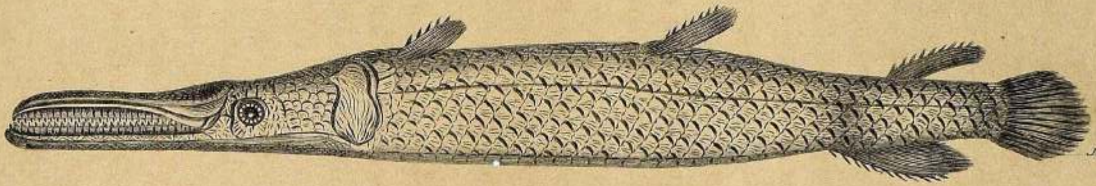
Greenish Pike, with slightly rose-coloured abdomen, square bony scales, and very long snout.

Esox osseus. *E. maxilla superiore longiore, squamis osseis. Lin. Syst. Nat. p.* 516.

Esox radiis primis serratis. *Bloch. t.* 390.

This is a fish of very considerable size, and of a highly remarkable appearance, being covered every where, except on the head and gill-covers, with very large, square, bony or very strong scales disposed in oblique rows along the sides: each individual scale is itself marked into four triangular spaces: the head is large, without scales, and slightly marked into subhexagonal divisions; the

gill-covers radiated; the snout very long; the upper jaw longer than the lower, and both beset along the edges with very numerous sharp teeth of unequal sizes; three small ones succeeding each of the longer throughout the whole length of the jaws: the eyes are rather small than large, and the nostrils are double on each side, and placed near the tip of the snout: the pectoral and ventral fins are small, and of an ovate shape: the dorsal and anal of similar form, and placed opposite each other at a small distance from the tail, which is rather short, and rounded or ovate: the first ray of all the fins, as well as that on each side the tail, is extremely strong, being edged with a double row of very strong scaly processes: a similar row, but still stronger, runs along the ridge of the back, consisting of pretty large, heart-shaped scales: the body is nearly cylindrical, or but very slightly compressed. The general colour of this fish is green, with a tinge of red about the gills, abdomen, and fins, of which the dorsal and anal, with the tail, are spotted with black. It is a native of the American lakes and rivers, growing to the length of three or four feet, and is said to be of a very voracious nature, swimming briskly, and preying on almost all the smaller fishes. It is considered as an excellent fish for the table, the flesh being white, firm, and well-flavoured.



Jackson sculp.

CEPEDIAN PIKE.

1804 May 10. London Publish'd by G. Kearsley Fleet Street.

CEPEDIAN PIKE.

Esox Cepedianus. *E. squamis quadratis osseis, rostro longo, maxillis spatulæformibus.*

Pike with square bony scales, long snout, and spatule-shaped jaws.

Lepisosteus Spatula. *Cepede. 5. p. 331. pl. 6. f. 2.*

Similar to the preceding species in general appearance, bony scales, &c. but with the head more compressed, flattened, and radiated with large bony divisions: the sides of the upper jaw, which is a trifle longer than the lower, are divided into four or five radiated bony plates, and about the eyes are several smaller divisions: the gill-covers are composed, as in the former species, of three plates, but the principal difference consists in the form of the snout, which is not so long in proportion, is dilated towards the tip into the form of a spatula, and is beset on each side with short, unequal, and crooked teeth, besides which the upper jaw is furnished with another row of longer and sharper ones, at unequal distances: the palate is also beset with several small teeth: the fins, in their form and situation, perfectly resemble those of the preceding species, but differ in the number of their rays; the dorsal having eleven, and the anal nine, whereas in the former species both the dorsal and anal have nine only. Native of the American seas and rivers Described by Cepede.

LEVERIAN PIKE.

Esox Leverianus. *E. squamis quadratis osseis, maxillis lātis, subæqualibus, rotundatis.*

Pike with square bony scales, and broad, nearly equal, rounded jaws.

Manjuari. *Descripcion de differentes piezas de Historia Natural las mas del ramo maritimo, representadas en sententia y cinco laminas. su autor Don Antonio Parra. t.* 40. *f.* 2.?

Similar to the first species in all particulars except that of the head, which is much flatter, and wider in proportion, with a broad and flat snout of very moderate length: the jaws are very nearly equal, the tip of the upper just curving slightly over that of the lower: teeth rather small for the size of the animal, and set in a single row in each jaw; those in front being larger and longer than the rest, as in both the preceding kinds: outline of the upper jaw somewhat undulated, and when viewed in direct profile slightly resembling the shape of that of the Nilotic Crocodile: length of the specimen about five feet: colour an uniform pale whitish or yellowish brown.

Whether this and the immediately preceding be truly distinct, or whether they may not constitute a variety of the same species, may, perhaps, be doubted.

CHILI PIKE.

Esox Chilensis. *E. supra aureus, subtus argenteus, squamis quadratis osseis, maxillis æqualibus, linea laterali cærulea.*

Gold-coloured Pike, silvery beneath, with square bony scales, equal jaws, and blue lateral line.

Esox Chilensis. *E. maxillis æqualibus, linea laterali cærulea. Lin. Gmel. p.* 1392. *Molina Chili p.* 196.

Allied to the preceding kinds, but of a different colour, being described by Molina, who seems to have been its first scientific observer, as of a golden cast above, and silvery beneath: the body is cylindric, covered with square and bony, but easily deciduous scales: the head large and flattened: the eyes large, orbicular, and lateral: the gape moderate: the teeth small, fixed, and close-set: the tongue entire, and the palate smooth: the branchial aperture lunated: the gill-covers composed of two plates: the lateral line blue, and the fins short and radiated. Native of the seas about Chili, where it is much esteemed for the table, having a white, flaky, semi-transparent, and delicious flesh: length from two to three feet.

GREEN PIKE.

Esox Viridis. *E. viridis, maxilla inferiore longiore, squamis tenuibus. Lin. Gmel. p.* 1389.

Green Pike, with large square thin scales, and lower jaw longer than the upper.

Similar to the above kinds as to habit, but of a smaller size, and covered with large, thin, soft, square scales: lower jaw longer than the upper: dorsal and anal fin exactly opposite: colour green. Native of the seas about Carolina, where it was observed by Dr. Garden. It appears to have been confounded by some with the *Acus maxima squamosa viridis* of Catesby, which, though not accurately figured by that author, is undoubtedly intended for the *Esox osseus* or *Bony-scaled Pike*. In the present species, according to Garden, the dorsal fin is furnished with eleven rays, and the anal with seventeen.

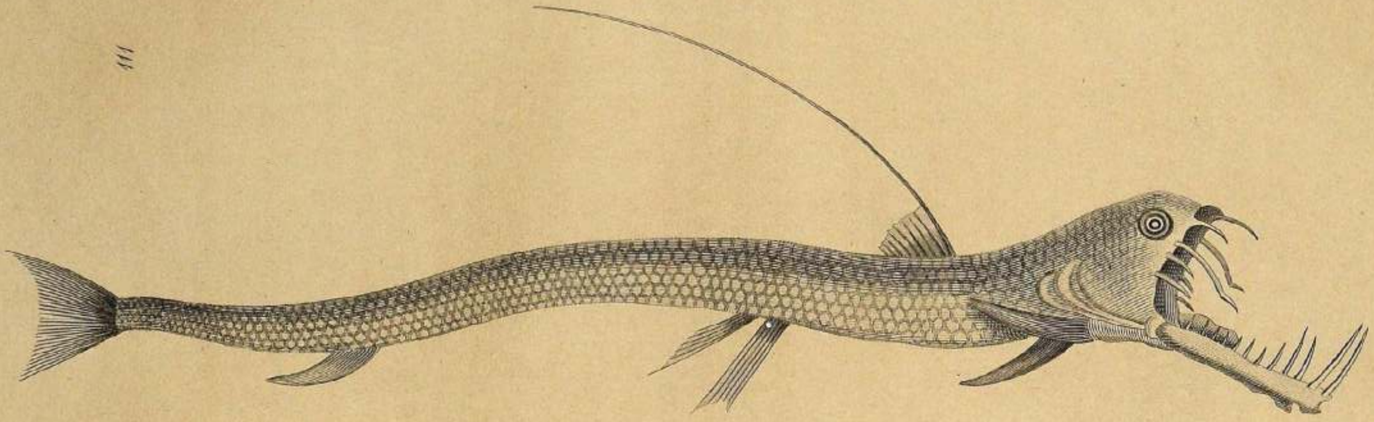
VIPER-MOUTHED PIKE.

Esox Stomias. *E. dentibus quatuor cæteris multo longioribus ore clauso prominentibus.*

Pike with four of the teeth much longer than the rest, and projecting from the mouth when shut. *Nat. Misc.* 9. *pl.* 344.

Vipera marina. The Viper-Mouth. *Catesb. Carol.* 2. *pl.* 19. *Append.*

This curious fish, which might perhaps more properly constitute a distinct genus than be ranked



Heath sculp.

PIPER-MOUTHED PIKE.

1804 June 1 London Published by G. Kearsley Fleet Street

under that of Esox, is a native of the Mediterranean sea, and seems to have been first described by Catesby from a specimen presented to Sir Hans Sloane. The specimen above-mentioned is preserved in the British Museum, but does not exhibit on its surface any of that reticulated or hexagonally marked appearance expressed in the figure of Catesby: this perhaps may have been obliterated by length of time. The representation here given is considerably smaller than the natural size; the fish being eighteen inches in length: its colour, when living, is said to be an obscure greenish brown. A specimen occurs also in the Leverian Museum.

POLYPTERUS. POLYPTERUS.

Generic Character.

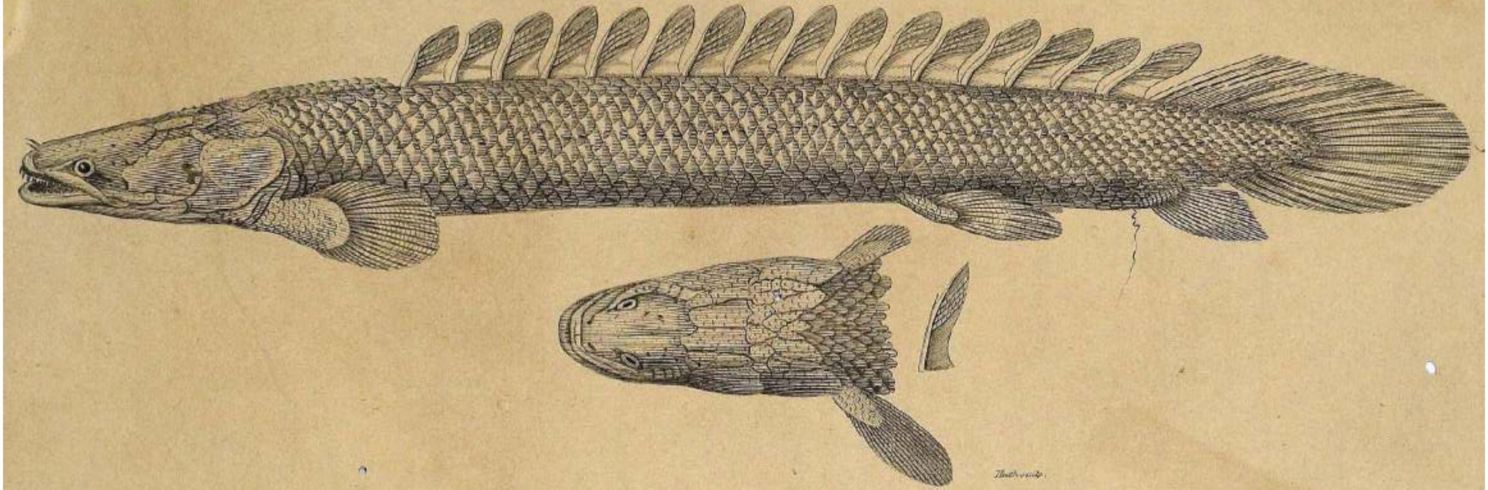
Membr: branch: uniradiata.	*Gill-membrane* single-rayed.
Pinnæ dorsales numerosæ.	*Dorsal fins* numerous.

NILOTIC POLYPTERUS.

Polypterus Niloticus. *P. viridis, abdomine nigro maculato.*
Green Polypterus, with the abdomen spotted with black.
Polyptere Bichir. *Geoffroy. Annales du Museum d'Histoire Naturelle.* 1. *p.* 57. *pl.* 5.

THE fish which constitutes this new and highly remarkable genus appears to have been first scientifically described by Mons[r]. E. Geoffroy, who considers it as forming in some degree a connecting link between the osseous and the cartilaginous fishes. Mons[r]. Geoffroy's observations relative to its form and nature may be found in the work mentioned at the close of the specific character.

In point of general affinity it seems most nearly allied to the genus Esox, and especially to those species which are furnished with large, strong and bony scales. Its shape is long and serpentiform, the body being nearly cylindrical: the head is defended by large bony pieces or plates, and the body covered with large and strong scales, very



NILOTIC POLYPTERUS

1804 June 1 London Published by G. Kearsley Fleet Street.

closely affixed to the skin, so that it may be considered as in some degree a mailed fish: the pectoral and ventral fins, but particularly the former, are attached by a sort of strong and scaly base or cubit, allowing the same kind of motion as in those of the genus *Lopius* among the cartilaginous fishes: the pectoral fins are placed immediately beyond the head; the ventral at a vast distance beyond it, the abdomen in this fish being of a very unusual length: the anal fin is seated at some distance beyond the ventral, very near the tail, and is of an ovate, but slightly pointed shape: the tail, which is rather small and short for the size of the animal, is of a rounded or ovate form, and consists only of soft, strait, articulated rays, so disposed in the membrane as to allow but little freedom of motion in this part: at a small distance beyond the head, along the whole length of the back, runs a continued series of small dorsal fins, to the number of sixteen, seventeen, or eighteen, the number varying slightly in different individuals: each of these fins is of an ovate shape, upright, or but very slightly inclining backwards, and is furnished with a very strong spine at its base or origin, while the remaining part consists of four or five soft and branched rays, connected by their uniting membrane: the first or spiny ray, at about two thirds of its height from the base, sends off a small secondary point or spine: the lateral line commences at a small distance from the gill-covers, from which it slightly descends for a small space, and then runs strait to the tail: the eyes are small and round:

the mouth of moderate width; the jaws furnished with a row of rather small and sharp teeth, and the upper lip with a pair of small and short tentacula at its tip: the vent is placed very near the tail, at the commencement of the anal fin: the branchial aperture is large, and in place of a membrane there is only a single bony plate or semicircular arch. The usual length of this fish is about eighteen inches, and its colour sea-green, paler or whitish on the abdomen, which is marked by some irregular black spots, more numerous towards the tail than towards the head: in the pectoral fins are usually about thirty-two rays; in the ventral twelve; in the anal fifteen; and in the tail nineteen. The stomach is long and large, measuring about four inches and a half; the liver long, and composed of two unequal lobes: the swimming-bladder double, and loose: the ovaries long, and the eggs about the size of millet-seeds.

This fish is known to the Egyptians by the name of *Bichir*, and is considered as a very rare animal: it is supposed in general to inhabit the depths of the Nile, remaining among the soft mud, which it is thought to quit only at some particular seasons, and is sometimes taken in the fishermen's nets at the time of the decrease of the river. It is said to be one of the best of the Nilotic fishes, having a white and savoury flesh; and as it is hardly possible to open the skin with a knife, the fish is first boiled, and the skin afterwards drawn off whole.

ELOPS. ELOPS.

Generic Character.

Caput læve. Dentium scabrities in maxillarum margine, palato.

Membr: branch: radiis triginta; præterea exterius in medio armata dentibus quinque.

Head smooth: edges of the jaws and palate rough with teeth.

Gill-membrane with thirty rays, and armed on the outside in the middle with five teeth.

SAURY ELOPS.

Elops Saurus. *E. cauda supra infraque armata. Lin. Syst. Nat. p.* 518.

Elops with the tail armed above and below with a spine.

Saurus maximus. *Sloane Jam.* 2. *p.* 284. *t.* 251.

Elops scuto mentali, pinna dorsali anali opposita. *Bloch. t.* 393.

THE Saury Elops, according to Sir Hans Sloane, is known in Jamaica by the name of the Sein-Fish, or Sea Gally-Wasp. He describes it in the following manner.

" This fish was about fourteen inches long, in the middle five inches round, and tapering to both ends: the mouth in both jaws had one row of small sharp teeth, and on the upper two more within, parallel to them, and a row of the same on the upper part of the cartilaginous tongue: three

quarters of an inch from the end of the snout were the eyes, round and grey: there were two *pinnæ post branchias,* two under the belly, one on the middle of the back, *post anum* another, and a forked tail: it was all over scaly, the back of a dark brown, and the belly of a white colour."

In general habit the Saury Elops bears some resemblance to a Pike, or rather to a Salmon: the scales are of moderate size; the head smooth and without scales; the tail much forked, and armed both above and below by a strong spine, forming a first or spiny ray on each side the tail: from the base of the tail, in the specimen figured by Dr. Bloch, runs a black stripe to the end of the middle division: the general colour of the fish is a silvery grey, dusky on the back, silvery on the abdomen, the head being slightly tinged with yellow: the fins are of a bluish brown. In the specimen above mentioned Dr. Bloch was not able to perceive the spine or strong ray on each side the tail. In a fine specimen in the British Museum it is very conspicuous. Dr. Bloch observes, as a distinguishing character of this fish, that the chin or under part of the mouth is armed by a kind of small, oblong, bony shield, interposed between the sides of the gill-membrane.

ARGENTINA. ARGENTINE.

Generic Character.

Dentes in maxillis, lingua.	*Teeth* in the jaws and tongue.
Membr: branch: radiis octo.	*Gill-membrane* with eight rays.
Corpus ano caudæ vicino.	*Vent* near the tail.
Pinnæ ventrales multiradiatæ.	*Ventral fins* many-rayed.

TOOTH-TONGUED ARGENTINE.

Argentina Glossodonta. *A. fusco-argentea, lingua palatoque imo osseo-tuberculatis, pinna ani octo-radiata.*

Silvery-brown Argentine, with the back of the palate and tongue beset with bony tubercles, and eight-rayed anal fin.

Argentina glossodonta. *A. pinna ani radiis octo. Lin. Gmel. p.* 1394. *Forsk. Arab. p.* 68.

A HIGHLY elegant species: general size and proportion that of the *Mugil Cephalus* or grey mullet: colour dusky brown, accompanied by a most resplendent silvery gloss: scales rather large, rounded, and well defined, and disposed into a kind of stripes, as in the *Grayling*: irides silvery: upper jaw longer than the lower, and forming a kind of obtuse snout: teeth in front of the upper jaw, very numerous, small, setaceous, and disposed in two

parallel ranges: those in front of the lower jaw disposed in a single range: base of the upper jaw, towards the throat, beset or paved with numerous, small, orbicular grinders or bony tubercles: tongue like that of some small quadruped, but on its back-part, or towards the throat paved with similar tubercles to those of the upper jaw: lateral line strait: tail bifid, and scaly between the lobes. Native of the Red Sea.

PEARL-BLADDERED ARGENTINE.

Argentina Sphyræna. *A. argentea nitidissima, pinna ani radiis novem.*

Bright-Silvery Argentine, with nine rays in the anal fin.

Argentina Sphyræna. *A. pinna ani radiis novem. Lin. Syst. Nat. Gmel. p.* 1394.

Pisciculus Romæ Argentina dictus. *Will. ichth. p.* 229.

This is a small fish inhabiting the Mediterranean sea, and is remarkable for the brilliancy of its appearance, being of a bright silver-colour, with a cast of green on the upper parts, and a purplish tinge on the head: the air-bladder is of as bright a colour as the body, resembling polished silver, and, together with the scales, affords some of the best kind of silvery matter used in the preparation of artificial pearls, being washed off, collected, and introduced into the small globes of glass blown for that purpose. The scales of many other fishes however are used in the same manufactory, which is said to be principally carried on in the city of Paris.

MACHNATA ARGENTINE.

Argentina Machnata. *A. lineari-lanceolata argentea, pinna ani radiis septendecim.*

Linear-lanceolate Argentine, with seventeen rays in the anal fin.

Argentina Machnata. *A. pinna ani radiis septendecim. Lin. Gmel. Forsk. Arab.*

Length about two spans, or more: colour silvery, with the back of a dusky blueish tinge: shape slender, not unlike that of an Anchovy: scales middle-sized: dorsal, anal, and caudal fins blueish-green; pectoral and ventral yellowish: lower jaw somewhat longer than the upper: eyes large: teeth small and numerous. Native of the Red Sea.

CAROLINA ARGENTINE.

Argentina Carolina. *A. argentata, dorso subfusco, pinna anali radiis quindecim. Lin. Gmel. p.* 1395.

Silvery-Argentine, with dusky back, and fifteen rays in the anal fin.

Harengus minor Bahamensis. *Catesb. Car.* 2. *t.* 24.

Size of a small Herring: colour silvery: lateral line strait: tail forked. Native of Carolina, inhabiting fresh waters.

ATHERINA. ATHERINE.

Generic Character.

Caput maxilla superiore planiuscula.	*Head* somewhat flattened over the upper jaw.
Membr: branch: radiis sex.	*Gill-membrane* six-rayed.
Corpus fascia laterali argentea.	*Body* marked by a silver lateral stripe.

MEDITERRANEAN ATHERINE.

Atherina Hepsetus. *A. subflavescens, dorso subolivaceo, pinna ani radiis duodecim.*

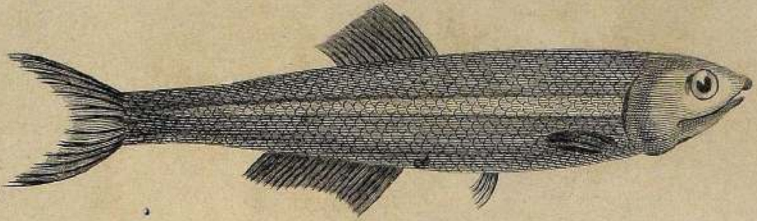
Subflavescent Atherine, with subolivaceous back, and about twelve rays in the anal fin.

Atherina Hepsetus. *A. pinna ani radiis fere duodecim. Lin. Syst. Nat. p.* 519.

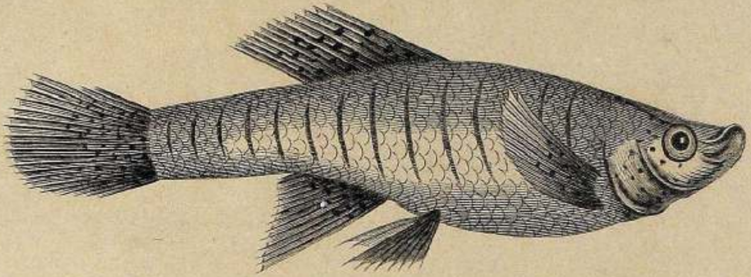
Atherina squamis rhombeis, radiis tredecim in pinna ani. *Bloch. t.* 393. *f.* 3.

AN elegant species: shape not unlike that of a Smelt: length six or seven inches: colour yellowish or pale, with some degree of transparency, and subolivaceous or dusky on the back: along the sides, from gills to tail, a bright, well-defined silvery band or stripe, through the middle of which passes the lateral line: eyes rather large: lower jaw somewhat longer than the upper: scales large: fins and tail white: dorsal fins two in number; the first situated on the middle of the back; the second opposite the

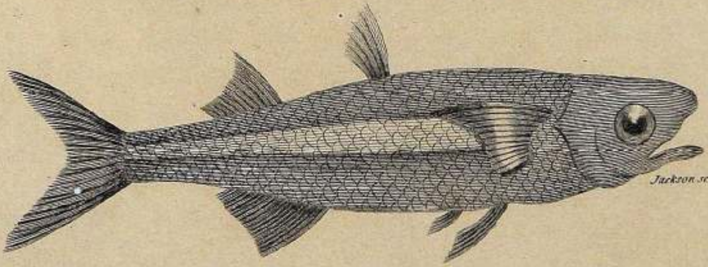
COMMERSONIAN ATHERINE.



BANDED ATHERINE.



OILY ATHERINE.



Jackson sculp.

anal fin: tail forked. Native of the Mediterranean and Northern seas. We are told by Mons[r]. Sonnini, in his Grecian travels, that this species, which is named *Athernos* by the modern Greeks, is seen in vast shoals about the coasts of the Grecian islands, and is easily taken in great quantities by the simple device of trailing in the water a horse's tail or a piece of black cloth fastened to the end of a pole; the fishes following all its motions and suffering themselves to be drawn into some deep cavity formed by the rocks, where they are readily secured by means of a net, and may be taken at pleasure. Mr. Pennant informs us that they are taken at almost all times of the year, except in very cold weather, about the coast of Southampton, where they are often called by the name of Smelts.

JAMAICA ATHERINE.

Atherina Menidia. *A. subflavescens, subpellucida, fascia laterali argentea, pinna ani radiis viginti-quatuor.*

Subflavescent, subpellucid Atherine, with silvery lateral stripe, and twenty-four rays in the anal fin.

Atherina Menidia. *A. pinna ani radiis viginti-quatuor. Lin. Syst. Nat. p.* 519.

Menidia corpore subpellucido. *Brown Jam. p.* 141.

A SMALL species, usually measuring about three inches in length: the head is pretty large in proportion to the body: the silvery lateral band is broad in proportion to the fish, and of a brilliant silver-colour. It is said to be an extremely delicate fish, and is in much esteem with the inhabitants of

Jamaica, in the harbours of which island it is very common, and is called by the name of the Silver-Fish, or Small Anchovy.

SIHAMA ATHERINE.

Atherina Sihama. *A. viridi-cærulescens subpellucida, pinna ani radiis viginti-tribus.*

Blueish-green subpellucid Atherine, with twenty-three rays in the dorsal fin.

Atherina Sihama. *A. pinnis ventralibus subthoracicis, radiis dorsalis pinnæ undecim.* *Forsk. Arab. p.* 70.

Shape lanceolate: length about a span and half: silvery band opake and rather obscure: ventral fins situated almost beneath the thoracic ones, so that the fish might be referred to the tribe of Thoracic Fishes: scales middle-sized: native of the Red Sea.

JAPANESE ATHERINE.

Atherina Japonica. *A. fusco-rubescens, fascia laterali latissima.*

Reddish-brown Atherine, with very broad lateral band.

A. Japonica. *A. pinna dorsi unica quinqueradiata.* *Lin. Gmel. Houttuyn Act. Haarl.* 20. *p.* 340.

Length three or four inches: head without scales: no visible teeth in the jaws. Native of the Japanese sea.

TRANSPARENT ATHERINE.

Atherina Pinguis. *A. hyalina, dorso obscuriore, pinnis pectoralibus fascia transversa argentea.*

Hyaline Atherine, with the pectoral fins marked by a transverse silver band.

Atherina pinguis. *Cepede. 5. p. 371.*

NATIVE of the Indian seas: mentioned by Cepede from the MSS. of Commerson: dorsal fin and tail brown; lower fins white: inside of the mouth of a bright silver-colour: esteemed a very delicate fish for the table.

MUGIL. MULLET.

Generic Character.

Labia membranacea: inferius introrsum carinatum. *Dentes* nulli: *Callus* inflexus supra sinus oris.

Membr: branch: radiis septem curvis.

Corpus carnosum: *squamæ* magnæ: *pinnæ dorsales* duæ.

Lips membranaceous; the inferior carinated within: *Teeth* none: at the corners of the mouth an inflected *Callus*.

Gill-membrane with six curved rays.

Body fleshy: *scales* large: *dorsal fins* two.

COMMON MULLET.

Mugil Cephalus. *M. griseo-argenteus, dorso subfusco, striis lateralibus longitudinalibus subnigris.*

Silvery-grey Mullet, with dusky back, and sides striped with longitudinal blackish lines.

Mugil Cephalus. *M. pinna dorsali anteriore quinqueradiata. Lin. Syst. Nat. p.* 520.

Mugil. *Plin. lib.* 9. c. 15. 17.

Mugil & Mugilis. *Salv.* 75. *Gesn. Aldr. &c.*

Mugil Cephalus. *Will. ichth. p.* 274.

Mugil corpore nigro lineato. *Bloch. t.* 394.

Mullet. *Penn. Brit. Zool.*

THIS fish, the *Mugil* and *Mugilis* of the ancient Romans, is a very common inhabitant of the Medi-

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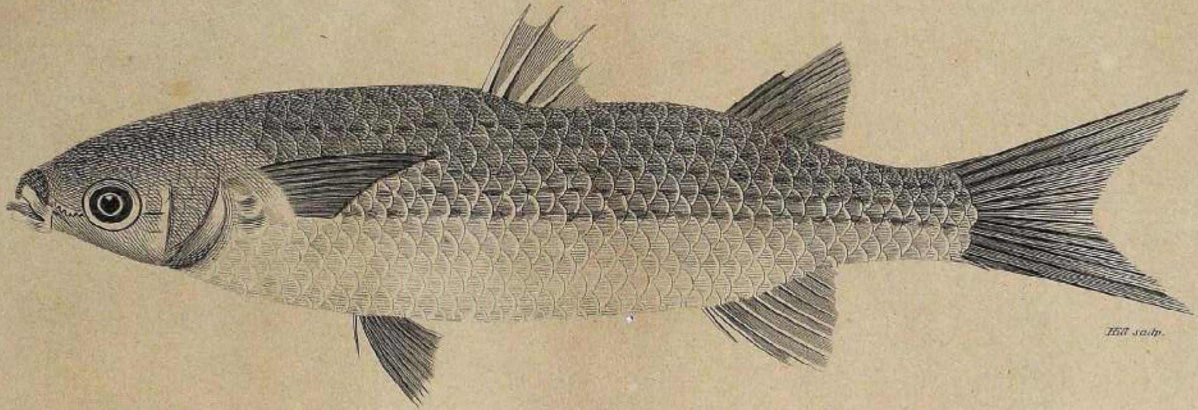


COMMON MULLET

1804 June 1 London Published by G. Kearsley Fleet Street.

terranean and Northern seas, frequenting chiefly the shallow parts near the shores, and feeding on the smaller kind of worms, sea-insects, and vegetables: its general length is from twelve to fifteen or sixteen inches, and its colour blueish grey, darker on the back and silvery on the abdomen: the sides are marked, like those of the Grayling, with several dusky stripes, according to the rows of scales, which are large and rounded: the fins are blueish: the head is rather large, pointed in front, and somewhat flattened at the top: the mouth small; the tongue rough, and the throat armed at its entrance with two roughened bones: the first dorsal fin, which is situated on the middle of the back, consists of four very strong rays*: the second dorsal fin is placed opposite the anal, and has only soft rays: the base of the dorsal and anal fin, as well as that of the tail, is scaly, and the tail is forked or lunated.

The Mullet is found not only in the European seas, but in the Indian and Atlantic oceans: it is observed to assemble frequently in small shoals near the shore, in quest of food, burrowing into the soft mud and leaving the trace of its head in the form of a round hole.

In the spring and early summer months this fish, like the Salmon, ascends rivers to a considerable distance, and when preparing for these expeditions is observed in shoals near the surface of the water, at which time the fishermen endeavour to avail themselves of the opportunity of surrounding them

* Of five, according to Linnæus.

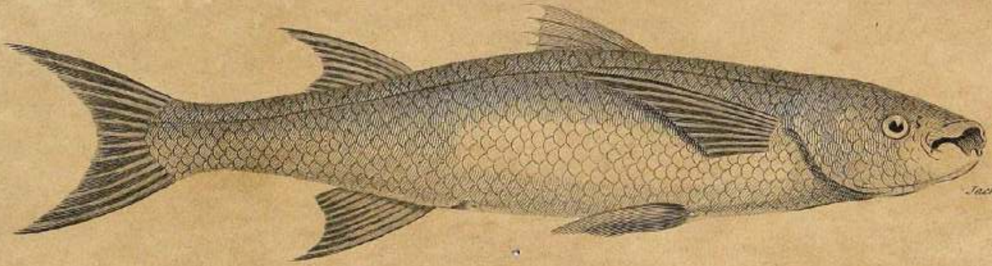
with their nets, which the fish are said to shew great address in escaping from.

The Mullet is considered as an excellent fish for the table, though not a fashionable one in our own country. Dr. Bloch informs us that it is generally eaten with the addition of oil and lemon-juice. The spawn is often prepared into an inferior kind of Caviar called Botargo, by drying and salting it; in which manner also the fish itself, in plentiful seasons, is occasionally preserved.

CRENATED MULLET.

Mugil Crenilabis. *M. albidus, subfusco lineatus, labris crenatis.*
Whitish Mullet, with brownish stripes, and crenated lips.
Mugil crenilabis. *M. pinna dorsali anteriore radiis quatuor flexilibus, posteriore inermibus, labiis crenatis, inferiore bicarinato. Lin. Gmel. Forsk. Arab.*

Size of the common Mullet: length about twelve inches: colour whitish; scales rather large, and marked by a dusky streak: upper lip gaping; lower bicarinated within, and both lips crenulated on the edges: fins glaucous white; the pectoral marked at the base by a round black spot: tail forked. Native of the Red sea: observed by Forskal, who mentions what he considers as three varieties, in one of which, called *Seheli*, the lips are not crenated; in the second, called *Our*, both the lips are ciliated, and the lower furnished with a single carina; and in the third, called *Tade*, the upper lip is finely ciliated, and the pectoral fins are without the black spot.



CRENATED MULLET.

1804. May 10. London Publish'd by G. Kearsley Fleet Street.

AMERICAN MULLET.

Mugil Albula. *M. albido-argenteus, pinna dorsali anteriore radiis quatuor.*

Silvery-white Mullet, with four rays in the first dorsal fin.

Albula Bahamensis. *Catesb.* 2. *t.* 6.

Mugil argenteus minor, &c. *Brown. Jam. p.* 450.

GREATLY allied to the common Mullet, but of a more slender form: mouth small and toothless: tail large and forked: inhabits the American seas, and is very frequent about the Bahama islands. It is considered as an excellent fish for the table.

INDIAN MULLET.

Mullus Malabaricus. *M. griseus, squamis magnis ciliatis, pinna dorsali secunda analique falcatis.*

Grey Mullet, with large ciliated scales, and the first dorsal and anal fin falcated.

Peddaraki Sovero. *Russ. pisc. ind. t.* 182.

LENGTH about two feet: head small; nape sinking in a little before the rise of the back: scales large and ciliated, both on the body and gill-covers: those on the head somewhat smaller: colour similar to that of the common Mullet, but with less conspicuous longitudinal streaks: first dorsal fin four-rayed: second dorsal fin falcated at the back-part: anal fin of nearly similar shape: tail large, and widely lunated. Native of the Indian seas.

TANG MULLET.

Mugil Tang. *M. griseo-argenteus, lineis longitudinalibus subflavis, operculis desquamatis.*

Silver-grey Mullet, with yellowish longitudinal streaks, and scaleless gill-covers.

Mugil Tang. *M. ore angustato, operculis desquamatis. Bloch. t.* 395.

Length about a foot: shape rather shorter and thicker than that of the common Mullet: head large; mouth small: eyes rather large: gill-covers without scales: those on the body large: colour silvery white, with longitudinal yellowish streaks: back brown: fins reddish: first dorsal four-rayed: tail slightly lunated. Native of Guinea, inhabiting fresh waters: called by the natives *Tang*, and considered as an excellent food.

Of this species a supposed variety is described by Dr. Bloch, in which the gill-covers were scaled, the colour of the fish brighter, the eyes more vertical, and the head smaller.

PLUMIER'S MULLET.

Mugil Plumieri. *M. luteus, ore amplo, pinnis dorsalibus duabus spinosis.*
Yellow Mullet, with wide mouth, and both dorsal fins spiny.
Mugil ore amplo. *Bloch. t. 396.*

Length about twelve inches: shape like that of the Tang, but with a very large head, wide mouth, and fleshy lips, which appear beset with a row of very small teeth round the edges: colour yellow, deeper or brownish-orange above: fins pale yellow: the first dorsal with four very strong rays: second dorsal with six strong rays also: scales large, rounded, striated, and each marked at the base by a dusky spot: tail slightly lunated. Native of the American seas: observed by Plumier, from whose drawing Dr. Bloch's figure of this species was engraved.

BLUE-SPOTTED MULLET.

Mullus Cæruleomaculatus. *M. fusco-cærulescens, abdomine argenteo, pinna dorsali radiis novem, pectoralibus macula cærulea.*
Blueish-brown Mullet, with silvery abdomen, nine rays in the dorsal fin, and a blue spot in the pectoral fins.
Mugil cæruleo-maculatus. *Cepede. 5. p. 389.*

Size of common Mullet: colour blueish brown, with silvery abdomen: dorsal and caudal fins brown: lower fins pale: at the base of the pectoral

fins a blue spot: the dorsal fin has nine rays, the pectoral sixteen, and the anal ten. Native of the Indian seas: observed by Commerson.

CHILI MULLET.

Mugil Chilensis. *M. pinna dorsali unica, cauda simplici. Lin. Gmel. Molin. Chil. p.* 198.

Mullet with single dorsal fin, and simple or even tail.

Length about twelve inches: general appearance extremely similar to that of the Common Mullet, but distinguished by having only one dorsal fin. Native of the American seas, and in much esteem as a food.

FORSKAL'S MULLET.

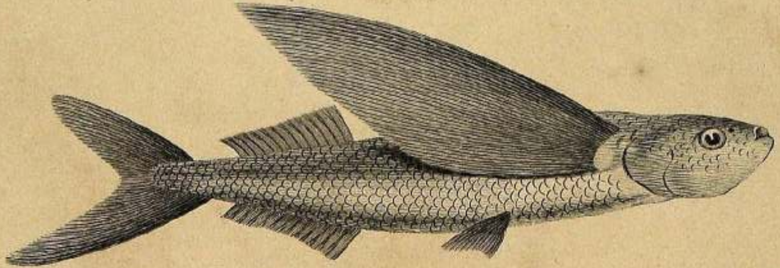
Mugil Chanos. *M. pinna dorsi unica, caudæ utrinque bialata. Lin. Gmel.*

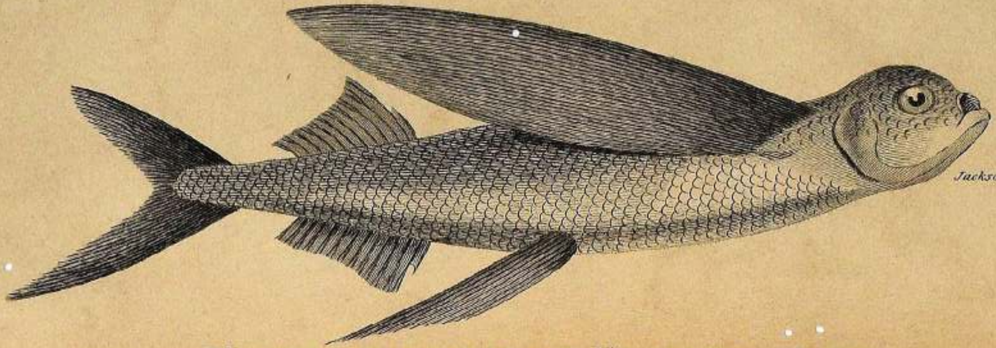
Mullet with single dorsal fin, and tail furnished with two wings or processes on each side.

Mugil magnus. *Forsk. Arab. p.* 74.

A much larger fish than the common Mullet: colour silvery: scales large, rounded, and finely striated: head slightly flattened: tail widely forked, and furnished on each side, towards the middle, with two membranaceous wings or processes. Native of the Red sea: observed by Forskal.

AMERICAN FLYING-FISH.





Jackson sculp.

MEDITERRANEAN FLYING-FISH.

EXOCOETUS. FLYING-FISH.

Generic Character.

Caput squamosum: maxillis utroque latere connexis.	*Head* scaly: connected on each side.
Membr: branch: radiis decem.	*Gill-membrane* ten-rayed.
Pinnæ pectorales maximæ, volatiles.	*Pectoral fins* very large, giving the power of flight.

MEDITERRANEAN FLYING-FISH.

Exocoetus Exiliens. *E. argenteus, dorso subfusco, pinnis ventralibus pone medium abdominis.*

Silvery Flying-Fish, with brownish back, and ventral fins situated beyond the middle of the abdomen.

Exocoetus exiliens. *E. pinnis ventralibus caudam attingentibus. Lin. Gmel. p.* 1400.

Exocoetus pinnis ventralibus elongatis prope anum. *Bloch. t.* 397.

Hirundo Plinii. *Aldrov. p.* 144.

Rondine. *Salv. p.* 185. Mugil alatus. *Rondel. Will. &c.*

THE fishes of this genus, which are very few in number, are remarkable for the extreme length and size of their pectoral fins, by which they are enabled to spring occasionally from the water, and to support a kind of temporary flight or continued motion through the air, to the distance of two or three hundred feet, when, the fins becoming dry,

they are again obliged to commit themselves to their own element. The species at present to be described is chiefly observed in the Mediterranean and Atlantic seas, where, according to an ingenious naturalist, "it leads a most miserable life: in its own element it is perpetually harassed by the Dorado and other fish of prey; and if it endeavours to avoid them by having recourse to the air, it either meets its fate from the Gull and the Albatross, or is forced down again into the mouth of the inhabitants of the water, which keep pace with its aerial excursion." This however ought to be considered as an exaggerated representation of the creature's state of existence, since, by the admirable balance ordained by Nature, the weaker animals have powers of escape in exact proportion to their danger*.

It should be observed that this power of flight or temporary skimming through the air to a con-

* To this purpose I may quote the observation of an ingenious gentleman (Capt. G. Tobin) who has had frequent opportunities of observing the habits of the Flying-Fish, and who thus expresses himself in a note annexed to a drawing of this species observed about the coasts of Otaheitee. "The lower half of the tail, in the Flying-Fish, is full twice the length of the upper: the use of it has always appeared evident to me. I have by the hour watched the Dolphins and Bonitos in pursuit of them, when, without wholly immersing themselves, which would have proved fatal to them, they have disposed in their progressive motion the lower part of the tail in such a manner as to supply their wings with moisture, so as to support them above the surface. I never saw one exceed the distance of an hundred yards in its flight, without being obliged to dip for a fresh supply."

siderable distance, is not entirely confined to this genus, but takes place in some species of the genus Scorpæna, as well as in that of Trigla, &c. as the reader may perceive in recurring to the descriptions of those genera in the former part of the present work.

The general length of the Mediterranean Flying-Fish is from twelve to fifteen or sixteen inches; and its general shape is not unlike that of a Herring: the body is subcylindrical but with a slight approach to square, if a transverse section be supposed: the head is rather large, and sloping pretty suddenly in front: the mouth small, and edged on both jaws with minute, pointed teeth: the eyes large, and of a silver-colour with a cast of gold: the scales are large, thin, and rounded: the whole animal is of a bright silvery cast, with a blue or dusky tinge on the upper part: the fins are also of a dusky colour: of these the pectoral extend as far as the beginning of the tail, and are of a sharply lanceolate form: the dorsal and anal fins are shallow, and placed opposite each other near the tail, which is deeply forked with sharp-pointed lobes, of which the lower is nearly twice the length of the upper: the ventral fins are rather large, of a lengthened and pointed shape, and situated a little beyond the middle of the abdomen towards the anal fin: on each side the lower part of the abdomen runs a kind of carina or lateral line formed by a series of small, inclining points, or spicules.

This species is frequently observed in the Mediterranean, sometimes singly, and sometimes ap-

pearing in small shoals. Instances are not infrequent of its falling into ships during the decline of its flight. It is considered as an agreeable fish for the table, and by some is even preferred to the Herring. The general height at which it is observed to exercise its flight is about three feet above the surface of the water.

OCEANIC FLYING-FISH.

Exocoetus Evolans. *E. argenteus, dorso subfusco, pinnis ventralibus ante medium abdominis.*

Silvery-Flying-Fish, with brownish back, and ventral fins situated before the middle of the abdomen.

Exocoetus evolans. *E. abdomine tereti. Lin. Syst. Nat. p.* 521.

Exocoetus volitans. *E. abdomine utrinque carinato. Lin. Syst. Nat. p.* 520.

Exocoetus pinnis ventralibus parvis prope pectus. *Bloch. t.* 398.

This species has so great a general resemblance with the preceding as to be easily mistaken by a common observer for the same fish. An accurate view however will inform the spectator that the body is somewhat longer or more slender in proportion, and the head less sloping; but the principal difference consists in the position and size of the ventral fins, which instead of being placed, as in the preceding species, near the anal fin, are, on the contrary, seated at no great distance from the pectoral ones: they are also much smaller and of a different shape, being of a slightly lunated form. This species is of a bright silver-colour, gradually

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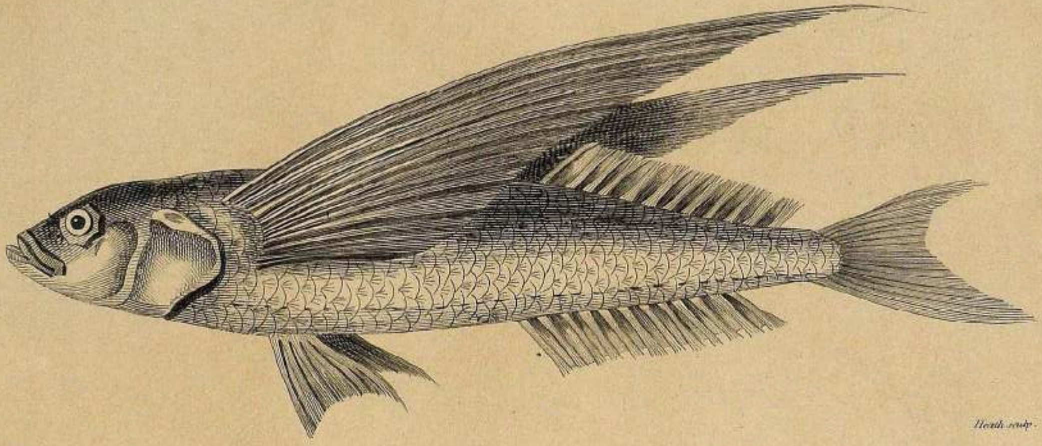


Heath sculp.

OCEANIC FLYING-FISH.

1804, June 2, London, Published by G. Kearsley Fleet Street.

deepening into purplish brown on the back: the pectoral fins are dusky, the dorsal and anal yellowish, and the ventral fins and tail reddish. It is a native of the American and Indian seas, but is occasionally observed, like the former, in the Mediterranean. Mr. Pennant records an instance of its being seen about the British coasts.

Dr. Bloch quotes, from Plumier, a very remarkable circumstance relative to the Flying-Fish: viz. that the spawn is of a quality so highly acrimonious, that the smallest particle cannot be tasted without an immediate partial excoriation of the tongue and palate. It is not certain however, from the account of Plumier to which particular species this acrimonious spawn belongs.

The air-bladder in this, and doubtless in the rest of the genus, is very large, and consequently well calculated for occasionally diminishing the specific gravity of the animal: there is also, according to Bloch, a peculiar kind of membrane on the sides of the mouth, which have the power, by their junction, of closing that part, even though the jaws be open, when air is blown into it through the aperture of the gill-covers, and this he imagines may still further contribute to the remarkable power of flight possessed by this genus, which has often been considered, and especially by the celebrated Bonnet, in his scale of Nature, as forming a kind of connecting link between Fishes and Birds, similar to that which the Bats may be supposed to form between Birds and Quadrupeds.

AMERICAN FLYING-FISH.

Exocoetus Mesogaster. *E. argenteo-cærulescens, pinnis ventralibus in medio abdominis.*
Silvery-blueish Flying-Fish, with the ventral fins situated on the middle of the abdomen.
Exocoetus pinnis ventralibus in æquilibrio. *Bloch. t.* 399.

ALLIED in the highest degree to the immediately preceding as to general appearance, but differs in the size and situation of the ventral fins, which in this species are placed exactly in the middle of the abdomen, and are moderately large, and of a rounded form. The colour of the fish is bright silvery, with a dusky tinge on the back: the fins are blueish, the dorsal and anal somewhat less shallow than those of the two preceding species. Native of the Atlantic ocean: observed by Plumier about the coasts of the Antilles.

COMMERSONIAN FLYING-FISH.

Exocoetus Commersonii. *E. macula atrocærulea in pinna dorsali.*
Flying-Fish with a dark-blue spot on the dorsal fin.
Exocoetus Commersonii. *Cepede.* 5. *p.* 401.

ALLIED to the E. evolans, but with the ventral fins placed beyond the middle of the abdomen, their tips reaching to about the middle of the anal fin: the dorsal fin is marked, on the part nearest the tail, with a large deep-blue spot. Native of the Indian seas: observed by Commerson.

Heath sculp.

PARADISE POLYNEME.

1804, June 1. London. Published by G. Kearsley, Fleet Street.

POLYNEMUS. POLYNEME.

Generic Character.

Caput compressum, undique squamosum, rostro obtusissimo, prominente.	*Head* compressed, covered with scales: snout very obtuse and prominent.
Membr: branch: radiis quinque vel septem.	*Gill-membrane* five or seven-rayed.
Digiti liberi setacei ad pinnas pectorales.	*Separate Filaments* or setaceous processes near the base of the pectoral fins.

PARADISE POLYNEME.

Polynemus Paradiseus. *P. luteus, digitis utrinque septem, cauda bifida.*

Yellow Polyneme, with seven filaments on each side, and forked tail.

Polynemus Paradiseus. *P. digitis septem, cauda bifida. Lin. Syst. Nat. p.* 522.

The Fish of Paradise. *Edw. vol.* 4. *pl.* 208.

Polynemus radiis septem jugularibus, pinna caudæ bifurca.? *Bloch. t.* 402.

THE genus Polynemus may be considered as holding the same station among the Abdominal Fishes which the genus Trigla does among the Thoracic ones; being distinguished by a similar circumstance, viz. that of being furnished on each side, near the base of the pectoral fins, with

several separate processes or articulated rays: these are, in general, much longer and more setaceous than in the Triglæ, and, in some species, even exceed the length of the whole body. The species of Polyneme are not very numerous, and are chiefly confined to the warmer latitudes.

The Polynemus Paradiseus or Mango-Fish, as it is generally called, which seems to have been one of the first of the genus known to the Europeans, is an inhabitant of the Indian and American seas, and grows to the length of about twelve or fifteen inches: it is a fish of an elegant shape, moderately broad in the middle, and gradually tapering towards the tail, which is very deeply forked: the scales are of moderate size, those towards the head and tail smaller than the rest: the thoracic filaments are of excessive length, the superior or outward ones often extending far beyond the tail; the others gradually shorten, the first or lowermost extending about half the length of the body. The colour of this fish is generally described as yellow, and its popular name of Mango-Fish is supposed to have been given it from that circumstance, as resembling the colour of a ripe Mango. Dr. Bloch however describes his specimen as of a silvery cast, with a tinge of blue on the upper parts: this may have been owing to a change of colour on being kept for a considerable time in spirits: the filaments also in Dr. Bloch's specimen seem to have met with some accidental mutilation, since they are far short of the length usually represented by other authors. Dr. Russel, in his work on the

Indian fishes, informs us that the Mango-Fish is reckoned by much the most delicate of any found at Calcutta. It is known to the natives by the name of *Tupsee Mutchey*.

SEBAN POLYNEME.

Polynemus Quinquarius. *P. digitis quinque, corpore longioribus. Lin. Syst. Nat. p.* 521.
Polyneme with five filaments longer than the body.
Pentanemus. *Seb. mus.* 3. 27. *f.* 2.

Extremely allied in general appearance to the Paradise Polyneme, resembling it in almost all particulars except in colour, which is described by Seba as whitish or silvery, and in the number of thoracic processes, which are only five on each side; the three superior ones far exceeding the length of the whole fish; the two inferior reaching to about a third of the body. Native of the American seas: perhaps, in reality, no other than a variety, or sexual difference of the preceding fish.

PLEBEIAN POLYNEME.

Polynemus Plebeius. *P. griseus, lineis supra longitudinalibus subnigris, digitis utrinque quinque, pinnis basi squamosis, cauda furcata.*

Grey Polyneme, marked above by longitudinal blackish lines, with five thoracic filaments on each side, all the fins scaly at the base, and forked tail.

Polynemus radiis quinque curtis liberisque jugularibus. *Bloch. t.* 400.

Polynemus plebeius. *Brouss. ichth. fasc.* 1. *Lin. Gmel. p.* 1401.

General appearance that of a Mullet, but with the head very obtuse in front, the mouth appearing as if placed beneath: colour silvery-grey, with a dusky tinge on the upper parts, and several dusky lines running from head to tail above the lateral line: scales rather large: all the fins scaly to some distance from the base: tail forked: thoracic filaments five in number on each side: the first of these is said by Gmelin to exceed the length of the body, the rest decreasing gradually: in Dr. Bloch's figure however, they are all represented as comparatively short, scarcely reaching half the length of the body, and he forms his specific character of the fish from this very circumstance, distinguishing it by the shortness of the filaments. It must however be obvious to every one that in a particular of this nature no great dependance can be placed on descriptions made from an individual specimen, which may have easily met with some accidental mutilation of these delicate organs.

This species is a native of the Indian and American seas, and is found about the coasts of several of the Southern Islands: it arrives at a very large size, measuring upwards of four feet in length. It is considered as an excellent fish for the table, and is in much esteem among the inhabitants of the Malabar coast: it is dressed in various ways, and is sometimes dried and salted for sale. Dr. Bloch informs us on the authority of a correspondent on whom he could rely, that this fish is commonly known in India by the title of *Royal Fish*, on account of its excellency, and laments that Broussonet (who seems to have named it from its want of particular splendor) should have given it the title of *P. plebeius*.

NILOTIC POLYNEME.

Polynemus Niloticus. *P. argenteus, digitis utrinque quinque mediocribus, naso subrubente.*

Silvery Polyneme, with five moderately long thoracic filaments on each side, and reddish snout.

Binni. *Bruce's Travels. Appendix.*

This, according to Mr. Bruce, who describes and figures it in the Appendix to his travels, is a large species, and may vie, for the elegance both of its form and taste, with any fish inhabiting the rivers running either into the Mediterranean or the Ocean. The specimen from which Mr. Bruce's figure was taken weighed thirty-two pounds, but is said often to arrive at the weight of seventy pounds

or more. It is an inhabitant of the river Nile, where it is by no means uncommon, as far up the river as *Syene* and the first cataract: the whole body is covered with scales of a brilliant silver-colour, so as to resemble spangles lying close together; and there is no variety of tinge on the fish, except a shade of red on the end of the nose, which is fat and fleshy: the eye is large and black, with a broad yellowish-white iris: the teeth are small, very sharp, and close-set: the first dorsal fin has eight spiny rays, the first of which is very short: the second dorsal fin has eleven soft or branched rays: the pectoral and ventral fins are also furnished with rays of a similar kind: the setaceous processes are five in number on each side, gradually lengthening as they recede from the mouth; the last appearing nearly to equal half the length of the body: the tail is deeply and sharply forked, the upper lobe extending somewhat beyond the lower.

We are informed by Mr. Bruce that in order to take this fish the Egyptian peasants prepare a pretty large mass or cake, consisting of oil, clay, flour, honey, and straw, kneading it with their feet till it is well incorporated: they then take two handfuls of dates, and break them into pieces about the size of the point of a finger, and stick them in different parts of the mass, into the heart of which they put seven or eight hooks with dates upon them, and a string of strong whipcord to each: this mass of paste is then conveyed by the fisherman or shepherd into the stream, the man sitting for this purpose on a blown-up goat-skin. When

arrived at the middle, he drops the mass in the deepest part of the stream, and cautiously holding the ends of each of the strings slack, so as not to pull the dates and hooks out of the middle of the composition, he makes to shore again, a little below the spot where he has sunk the mass, and separating the ends of the strings, ties each of them, without straining, to a palm-branch fastened on the shore, to the end of which is fastened a small bell. He then goes and feeds his cattle, or digs his trenches, or lies down to sleep: in the mean time the cake, beginning to dissolve, the small pieces of date fall off, and flowing down the stream, are eagerly seized on by the fishes as they pass: they rush up the stream, picking up the floating pieces as they go, till at length they arrive at the cake itself, and voraciously falling to work at the dates which are buried in it, each fish in swallowing a date, swallows also the hook in it, and feeling himself fast, makes off as speedily as possible: the consequence is that in endeavouring to escape from the line by which he is held, he pulls the palm-branch to which it is fastened, and thus gives notice of his capture by ringing the bell. The fisherman runs, and having secured the fish, puts a strong iron ring through his jaw; ties a few yards of cord to it, and again commits him to the water, fastening the cord well to the shore. This is practised in order to presesve the fish ready for sale, since fish in general, when dead, will not keep long in these regions. It is rarely that on these occasions a single hook is found empty. The inhabitants of

the towns of *Achmim*, *Girge*, and others, repair at intervals to the shores as to a fish-market, and are thus supplied by the country people.

TEN-FINGERED POLYNEME.

Polynemus Decadactylus. *P. argenteo-fuscus, capite obtusissimo, oculis maximis, digitis utrinque decem, cauda furcata.*

Silvery-brown Polyneme, with very obtuse head, very large eyes, ten shortish thoracic filaments on each side, and forked tail.

Polynemus decadactylus. *P. radiis decem liberis jugularibus. Bloch. t.* 401.

This is a species of considerable size, generally measuring from one to two feet: its colour is an uniform deep yellowish brown, darker on the back, and glossed with silver on the sides and abdomen, the silvery tinge appearing like a spot or patch on the middle of each scale: the head is abruptly rounded off in front, so as to appear excessively obtuse: the eyes are very large, with a bright silvery iris: the mouth of moderate width, and the tongue smooth and loose: the thoracic filaments are ten in number on each side, and of very moderate length, extending only a few inches: the tail is deeply forked.

This species is a native of the African seas, and is not uncommon about the coasts of Guinea, occasionally entering the rivers of that country, and is considered as a wholesome and agreeable fish for the table.

INDIAN POLYNEME.

Polynemus Indicus. *P. plumbeus, abdomine albido atomis nigris, digitis utrinque quinque breviusculis, cauda falcato-furcata squamosa.*

Lead-coloured Polyneme, with whitish abdomen freckled with black points, five rather short thoracic filaments on each side, and falcate-forked scaly tail.

Maga Booshee. *Russel Pisc. Ind. t.* 184.

LENGTH sixteen or eighteen inches: shape somewhat lengthened: scales middle-sized, covering not only the body and head, but also the tail itself to the very extremity of the forks: thoracic processes five in number on each side, the upper or longest reaching nearly half the length of the body, the rest gradually shortening to about the length of an inch and half: snout obtusely-acuminate: fins dark or blackish: eyes rather large. Native of the Indian seas: in much esteem for the table, and called by the English *Rowball.*

FOUR-FINGERED POLYNEME.

Polynemus Tetradactylus. *P. fusco-cæruleus, subtus canus, digitis utrinque quatuor brevibus, cauda furcata squamosa.*

Dusky-blue Polyneme, grey beneath, with four short thoracic filaments on each side, and scaly, forked tail.

Maga Jellee. *Russel. Pisc. Ind. t.* 183.

SIZE and habit of a Common Mullet: colour dusky blue above, and grey beneath: behind the orbits a lunated yellow spot: scales middle-sized:

tail forked, but less deeply than in the preceding species, and covered with scales to the edge of the fin: thoracic processes on each side four in number, and remarkably short, scarce exceeding the length of an inch and half. Native of India; esteemed for the table, and, like the former, called Rowball by the English.

VIRGINIAN POLYNEME.

Polynemus Virginicus. *P. digitis septem, cauda integra. Lin. Syst. Nat. p.* 1400.

Polyneme with seven thoracic filaments on each side, and entire tail.

Gill-covers serrated: first ray of the dorsal fin very short: tail broad and with sharp-pointed tips: native of Virginia, and sometimes, like the Polynemus Paradiseus, called by the name of Mango-Fish.

COMMERSON'S POLYNEME.

Polynemus Commersonii. *P. argenteus, lineis longitudinalibus fuscis, digitis utrinque quinque ad pinnas ventrales extensis.*

Silvery Polyneme, with longitudinal brown stripes, and five thoracic filaments on each side reaching as far as the ventral fins.

Polynemus lineatus. *Cepede.* 5. *p.* 409.

Length about ten or twelve inches: colour silvery, with a blueish cast on the upper parts, and marked on each side from head to tail by about

twelve brown stripes: snout semitransparent and produced: both jaws furnished with small teeth, and the throat with four rough bones or tubercles: thoracic filaments five on each side, reaching as far as the ventral fins. Native of the Indian seas: observed by Commerson.

PLUMIER'S POLYNEME.

Polynemus Plumieri. *P. argenteus, digitis utrinque sex.*
Silvery Polyneme with six thoracic filaments on each side.
Polydactylus Plumieri. *Cepede. 5. p.* 418.

Native of the American seas: mentioned by Cepede from a drawing by Plumier: shape rather deeper or broader than in most of the genus: scales middle-sized: eyes large: thoracic filaments of nearly equal length, and reaching rather farther than the middle of the body: tail large and widely lunated.

CLUPEA. HERRING.

Generic Character.

Mystaces maxillarum superiorum serrati.	*Side-Plates* of the upper mandible serrated.
Membr: branch: radiis octo. Branchiæ intus setaceæ.	*Gill-membrane* eight-rayed: gills internally setaceous.
Abdomen acutum, sæpius carinatum.	*Abdomen* sharp, and, generally, serrated.

COMMON HERRING.

Clupea Harengus. *C. argentea, dorso subfusco, maxilla inferiore longiore, squamis facile deciduis.*

Silvery Herring, with dusky back, lower jaw longer than the upper, and easily deciduous scales.

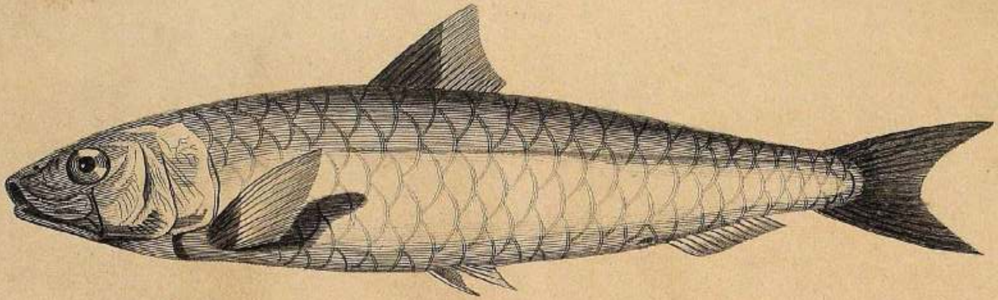
Clupea Harengus. *C. immaculata, maxilla inferiore longiore. Lin. Syst. Nat. p.* 522.

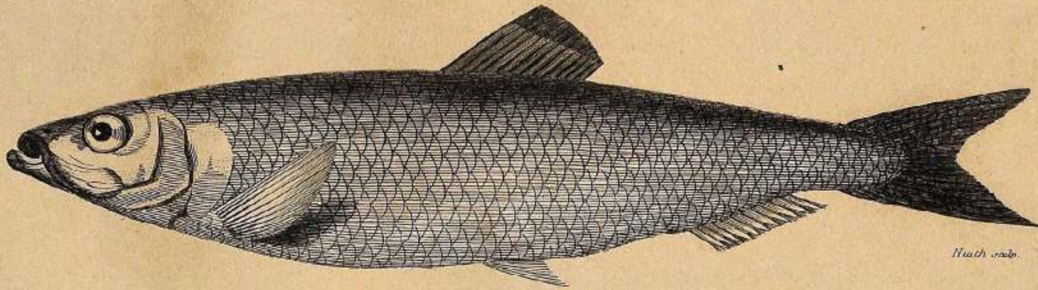
Clupea maxilla inferiore longiore, pinnæ ani radiis septendecim. *Bloch. t.* 29. *f.* 1.

British Herring. *Penn. Brit. Zool.*

THIS fish, so eminently important in a commercial view, and which may justly be said to form one of the wonders of the northern world, is principally distinguished by the brilliant silvery colour of its body, the advancement of the lower jaw beyond the upper, and by the number of rays in the anal

PILCHARD.





Heath sculp.

COMMON HERRING.

1804, June 2. London, Published by G. Kearsley, Fleet Street.

fin, which, in by far the greater number of specimens, are found to amount to seventeen*: the back is of a dusky blue or greenish cast, and in the recent or living fish the gill-covers are marked by a reddish, and sometimes by a violet-coloured spot: the eyes are large; the mouth without visible teeth; the openings of the gill-covers very large; the scales rather large, and easily deciduous; the lateral line not very distinctly visible; the abdomen pretty sharply carinated, and in some specimens, slightly serrated: the fins are rather small than large for the size of the fish, and the tail strongly forked. In size the Herring is observed to vary greatly, and there are probably some permanent varieties of this species which yet want their exact description. The general size is perhaps from ten to twelve or thirteen inches.

Important as is this fish to the inhabitants of modern Europe, it is doubted whether it was distinctly known to the ancient Greeks and Romans: at least we find no certain description in their writings either of its form or uses. The herring fishery however is of very considerable antiquity: the Dutch are said to have engaged in it so long ago as the year 1164, and were in possession of it for several centuries, and Flanders had the honour of discovering the method of preserving this fish by pickling it. One William Beukelen, of Biervlet, near Sluys, is said to have been the inventor of this

* Mr. Pennant says fourteen: the number indeed is not absolutely constant, but the most general appears to be seventeen.

useful expedient, and from him, according to Mr. Pennant, is derived the word *pickle*, which we have borrowed from the Dutch and Germans. Beukelin died in the year 1397. The Emperor Charles the fifth is said to have held his memory in such veneration for the service he had done mankind, as to have paid a solemn visit to his tomb in honour of so distinguished a citizen. "The Dutch (says Mr. Pennant) are most extravagantly fond of this fish when pickled; a premium is given to the first vessel that arrives in Holland laden with this their ambrosia: we have been in the country at that happy minute, and have observed as much joy among the inhabitants on its arrival as the Egyptians shew at the first overflowing of the Nile."

Mr. Pennant, in his British Zoology, has so well detailed the general history of the Herring, and its supposed migrations, that it is impossible to do better than to repeat his own words.

"The great winter rendezvous of the Herring is within the Arctic circle: there they continue many months in order to recruit themselves after the fatigue of spawning, the seas within that space swarming with insect food in a far greater degree than in our warmer latitudes.

"This mighty army begins to put itself in motion in the spring: we distinguish this vast body by that name, for the word Herring is derived from the German, Heer, an army, to express their numbers.

"They begin to appear off the Shetland isles in April and May: these are only forerunners of the

grand shoal which comes in June, and their appearance is marked by certain signs, by the numbers of birds, such as Gannets and others, which follow to prey on them: but when the main body approaches, its breadth and depth is such as to alter the very appearance of the ocean. It is divided into distinct columns of five or six miles in length and three or four in breadth, and they drive the water before them with a kind of rippling: sometimes they sink for the space of ten or fifteen minutes; then rise again to the surface, and in bright weather reflect a variety of splendid colours, like a field of the most precious gems, in which, or rather in a much more valuable light, should this stupendous gift of Providence be considered by the inhabitants of the British isles.

"The first check this army meets in its march southward, is from the Shetland isles, which divide it into two parts; one wing takes to the east, the other to the western shores of Great Britain, and fill every bay and creek with their numbers: others pass on towards Yarmouth, the great and ancient mart of Herrings: they then pass through the British channel, and after that, in a manner disappear: those which take to the west, after offering themselves to the Hebrides, where the great stationary fishery is, proceed towards the North of Ireland, where they meet with a second interruption, and are obliged to make a second division: the one takes to the western side, and is scarce perceived, being soon lost in the immensity of the Atlantic; but the other, which passes into the Irish sea, re-

joices and feeds the inhabitants of the coasts that border it.

"These brigades, as we may call them, which are thus separated from the greater columns, are often capricious in their movements, and do not shew an invariable attachment to their haunts."

The reality of the migration of the Herring, so well detailed by Mr. Pennant, begins at present to be greatly called in question; and it is rather supposed that this fish, like the Mackrel, is in reality at no very great distance during the winter months from the shores which it most frequents at the commencement of the spawning season; inhabiting in winter the deep recesses of the ocean, or plunging itself beneath the soft mud at the bottom; but at the vernal season it begins to quit the deeper parts, and approach the shallows in order to deposit its spawn in proper situations; and this is thought a sufficient explanation of the glittering myriads which at particular seasons illumine the surface of the ocean for the length and breadth of several miles at once*. As a proof of this Dr. Bloch observes that Herrings are in reality found at almost all seasons of the year about some of the European coasts, and that the northern voyages, supposed by Pennant and others, are impracticable in the short period assigned by naturalists; the fish, in its swiftest progress being utterly incapable of moving at so rapid a rate as this migration necessarily sup-

* Herrings spawn at different seasons; some in spring, some in summer, and some in autumn.

poses. For these and other reasons Dr. Bloch is inclined to believe the long voyage of the Herring to exist only in the minds of its describers.

Among the principal enemies of this fish may be numbered the various species of Whales*, some of which are observed to pursue large shoals, and to swallow them in such quantities, that in the stomach of a single whale no less than six hundred herrings are said to have been found. Besides the whale, various species of marine birds of prey are perpetually assailing them either on the water or from above. The Herring itself is supposed to feed principally on sea-insects and the smaller kind of marine worms.

Exclusive of the various methods of preparing this fish for sale in different countries, a great quantity of oil is drawn from it, forming a great and important commercial article among the northern nations, and particularly among the Swedes.

* Particularly a Whale called the *Nord-Caper*, a very swift animal of the Orc tribe.

PILCHARD.

Clupea Pilchardus. *C. argentea, dorso subfusco, squamis magnis arcte infixis.*

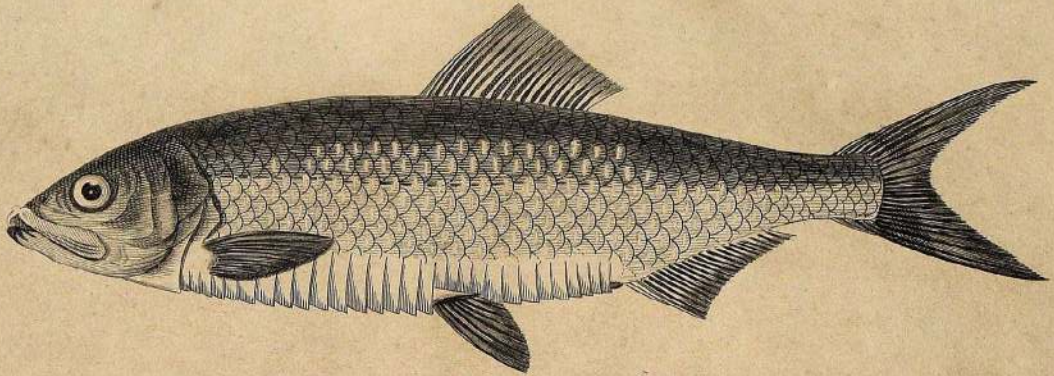
Silvery Herring, with dusky back, and large, strongly adherent scales.

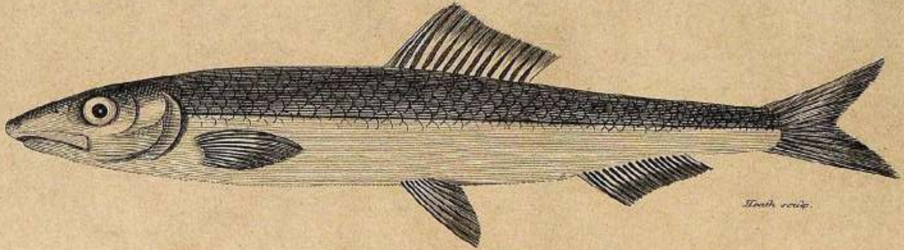
Pilchard. *Will. ichth. p.* 223. *Penn. Brit. Zool.*

Clupea Pilchardus. *Bloch. t.* 406.

The Pilchard is very nearly allied in general appearance to the Herring, but is of a somewhat thicker or less compressed form, with the back more elevated and the belly less sharp; the nose rather shorter in proportion and turning upwards, and the under jaw shorter: the scales are considerably larger than in the Herring, and are pretty strongly fixed; those of the Herring on the contrary being very easily displaced. A still more remarkable difference consists in the situation of the dorsal fin, which is placed exactly in the centre of gravity, so that when the fish is taken up by it the body preserves an equilibrium; whereas if the Herring be taken up by the same part the head will be observed to dip considerably: to these differences it may be added that the Pilchard is in general of inferior size to the Herring, and rarely measures more than about eight inches in length: its colour is bright silvery, with a green or blueish cast on the upper parts. It is a fish which seems to have escaped the notice of many ichthyologists, by whom it has been confounded with the Herring, or at most considered as a variety of that species. Its

SHAD.





Heath sculp.

ANCHOVY.

1804 June 1 London Published by G. Kearsley Fleet Street.

general habits seem to resemble those of the Herring, and it appears in almost equal plenty about several of the European coasts, particularly about those of the southern parts of our own island, where it is taken in vast quantities. The numbers, says Mr. Pennant, from the attestation of Dr. Borlace, that are taken at one shooting out of the nets is amazingly great. On the fifth of October 1767 there were at one time included in St. Ives's bay 7000 hogsheads, each hogshead containing 35000 fish, in all 24000000.

The Pilchard, according to Mr. Pennant, usually appears in vast shoals off the Cornish coasts about the middle of July, disappearing in the beginning of winter, though a few return again after Christmas: their winter retreat, the same author observes, is supposed to be the same with that of the Herring.

SHAD.

Clupea Alosa. *C. argentea, dorso subfusco, abdomine squamis dilatatis carinato.*

Silvery Herring, with dusky back, and abdomen carinated with dilated scales.

Clupea Alosa. *C. lateribus nigro maculatis, rostro bifido. Lin. Syst. Nat. p.* 523.

Clupea maculis nigris utrinque. *Bloch. t.* 30. *f.* 1.

Shad. *Penn. Brit. Zool.*

This species resembles the Pilchard in general appearance, but is of much larger size, much thinner or flatter in proportion, and is farther distinguished by the scales on the lower part of the abdomen,

'which are dilated on each side into a kind of laminæ, the bottom forming a sharp carina down the belly the colour of the body is bright silver, inclining to dusky on the back, and marked on each side, at a small distance from the gills, by four or five or more rounded black spots, of which the first or that nearest the gills is the largest: the scales are rather large: the upper lip is divided by a deep incisure on the lower part: the fins are of a blueish tinge, the tail forked, and marked on each side the base by a subtriangular dusky patch: the lateral line runs nearly strait from the gills to the tail: on each side the abdomen, at the base of the ventral fins, is a small pointed appendage or process.

This fish is a native of the Mediterranean and Northern seas, and, like the Salmon, ascends rivers at particular seasons, for the purpose of depositing its spawn, being found, according to Bloch in the Rhone in the month of March, and in the Volga, the Rhine, and the Elbe in April. It is observed to deposit its spawn in the deepest part of the river, and towards autumn returns again to the sea. It grows to the length of two or three feet. It is generally observed to be poor and meagre when it first quits the sea, but grows fatter the longer it continues in fresh water. Like the Herring, it dies almost immediately after being taken out of the water, and is supposed to feed chiefly on worms, insects, and young fish.

According to Mr. Pennant the Shad is found in greater perfection in the Severn than in any other British river, making its first appearance in April

or May, according to the temperature of the season. The Thames Shad, according to the same author, does not appear till the latter end of May or beginning of June, and is esteemed but a coarse and insipid fish. It seems to be subject to some variety: is not always marked by the black spots mentioned in the specific character; and is sometimes seen of a dusky and sometimes of a cupreous or rufous tinge.

SPRAT.

Clupea Sprattus. *C. argentea, dorso subfusco, maxilla inferiore longiore, abdomine serrato.*

Silvery Herring, with brownish back, lower jaw longer than the upper, and serrated addomen.

Clupea Sprattus. *C. maxilla inferiore longiore, pinnæ ani radiis septendecim. Bloch. t.* 29. *f.* 2.

Clupea Sprattus. *Lin. Syst. Nat. p.* 523.

La Sardine. *Duham.* 2. *p.* 418.

Sprat. *Penn. Brit. Zool.*

So much allied to the Herring in almost all points except in size as to have been frequently considered as the young of that fish: indeed the differences are, at first view, so slight, that it is not very easy to form a true specific character. Mr. Pennant observes that the chief difference consists in the abdomen, which in the Sprat is strongly serrated: he adds that the vertebræ in the back bone of the Sprat are forty-eight in number, but in that of the Herring fifty-six: the back fin is placed more remote from the head than in the

Herring, and is, in general, furnished with about sixteen or seventeen rays*.

The Sprat, says Mr. Pennant, appears in the river Thames, below bridge, in the beginning of November, and leaves it in March, and during its appearance is a great relief to the poor of the Capital. At Gravesend and Yarmouth Sprats are cured like red Herrings, and are sometimes pickled, being in that state little inferior to the Anchovy, though the bones will not dissolve as in that fish. Like the Herring and the Pilchard the Sprat often visits the coasts of the Mediterranean and Northern seas in prodigious shoals, and usually spawns in autumn in the deeper parts of the coast.

ANCHOVY.

Clupea Encrasicolus. *C. argentea, dorso subfusco, maxilla superiore longiore.*

Silvery Herring, with dusky back, and upper jaw longer than the lower.

Clupea Encrasicolus. *C. maxilla superiore longiore. Lin. Syst. Nat. p.* 523.

Clupea maxilla superiore prominente, rictu amplo. *Bloch. t.* 30. *f.* 2.

Anchovy. *Will. ichth.* 225. *Penn. Brit. Zool.*

The general length of this species is from three to four inches, but it is sometimes seen of the length of six inches and upwards: it is of a somewhat

* There appears to be some mistake on this subject in the Systema Naturæ; the specific character announcing thirteen rays, while in the note annexed the number is seventeen.

lengthened form, and is covered with large thin, and easily deciduous scales: the eyes are large, the upper jaw considerably longer than the lower, and the tongue doubly ciliated on each side: the back is of a dusky greenish cast, with a degree of transparency; the abdomen smooth, and the tail forked.

The Anchovy is found in great plenty in the Mediterranean, Northern, and Atlantic seas, and like the Herring, is supposed to leave at particular periods the deep recesses of the ocean, and to seek the shallower parts for the purpose of depositing its spawn: this commences at the vernal season and continues for a very considerable time. The great fishery for Anchovies is said to be at Gorgona, a small isle to the west of Leghorn. They are taken in vast quantities, and prepared for sale by salting and pickling: the bones dissolve entirely in boiling, which renders this species so peculiarly convenient in the preparation of various sauces, &c. It is supposed to have been well known to the ancient Greeks and Romans, who prepared from it one kind of Garum or condiment for their tables, though the principal article of that name is rather thought to have been prepared from other fishes.

MALABAR HERRING.

Clupea Malabarica. *C. albo-cærulescens, maxilla inferiore curva, squamis magnis, abdomine serrato.*

Blueish-white Herring, with curved lower jaw, large scales, and serrated abdomen.

Clupea Malabarica. *C. maxilla inferiore curva. Bloch. t.* 432.

LENGTH about twelve inches: shape like that of the common Herring, but deeper: colour white, slightly shaded with pale blue on the edges of the scales: head and back brownish: head rather large and short: lower jaw a trifle longer than the upper, and turning up: lips or side-plates pretty strongly serrated: fins pale, or whitish: the anal fin shallow, but of greater extent than in most of this genus: tail forked: lateral line nearer the back than the abdomen. Native of the Indian seas, and observed about the coasts of Malabar, but in no esteem as a food, and only occasionally eaten by the lowest orders.

AFRICAN HERRING.

Clupea Africana. *C. argentea, dorso olivaceo, abdomine serrato, pinnis ventralibus minimis.*

Silvery Herring, with olivaceous back, serrated abdomen, and very small ventral fins.

Clupea Africana. *C. pinna ani longa, maxilla inferiore longiore. Bloch. t.* 407.

LENGTH a foot: shape much deeper than that of the common Herring, and rather approaching to

that of a Carp: body much compressed, with the abdomen very sharp, and strongly serrated or carinated as far as the vent by dilated scales, as in the Shad: colour silvery, with a dusky blueish tinge on the upper parts: orbits of the eyes serrated beneath: scales moderately large: lateral line nearer the back than the abdomen, and slightly curving: fins pale; anal shallow and of still greater extent than in the preceding species: ventral fins so very small as to bear the appearance of mere rudiments or slightly expanded processes on that part: tail forked. Native of the African seas, and said to be extremely plentiful during the summer months about the coasts of Guinea.

CHINESE HERRING.

Clupea Sinensis. *C. argentea, dorso subviolaceo, abdomine serrato, pinnis flavis, dorsali caudaque nigro marginatis.*

Silvery Herring, with subviolaceous back, serrated abdomen, and yellow fins, the dorsal fin and tail edged with black.

Clupea Sinensis. *C. ore edentulo, radio infimo branchiostegæque truncato. Bloch. t. 405.*

Length ten or twelve inches: shape deeper than that of the preceding, and the abdomen compressed and sharply serrated, or carinated by dilated scales as far as the vent: colour silvery, brownish above, and marked by several obscure longitudinal yellowish stripes: head small and short: eyes large: mouth small: scales large: fins yellowish white, the dorsal marked at the base and along the edge

by a black band: tail forked, and terminated with a broad black band. Native of the Indian and American seas, and sometimes found in rivers: in considerable esteem as an edible fish.

THRISSA HERRING.

Clupea Thrissa. *C. argenteo-cærulescens, pinnis pectoralibus rubris, radio ultimo pinnæ dorsalis elongato.*

Silvery-blueish Herring, with red pectoral fins, and the last ray of the dorsal fin elongated.

Clupea Thrissa. *C. pinna ani radiis viginti-octo, dorsalis radio postremo setaceo. Lin. Syst. Nat. p.* 524.

C. radio ultimo dorsali elongato, pinna ani recto. *Bloch. t.* 404.

Length about twelve inches: shape of the body deep, the abdomen projecting considerably, and being serrated beneath, but without any dilatation on the sides of the scales: colour blueish silvery, with a dusky cast on the back: head small: mouth small: scales large: lateral line running nearly strait from gills to tail: dorsal fin slightly scaled at the base, and terminated behind or at the shallowest part by a very long single ray, extending nearly as far as the base of the tail, which is strongly forked: all the fins blueish, except the pectoral, which are red. Native of the American seas: observed by Plumier: inhabits rivers at the spawning season, and deposits its eggs among aquatic plants, &c.

GIANT HERRING.

Clupea Gigantea. *C. argenteo-cœrulescens elongata, abdomine roseo, squamis subhexagonis, radio ultimo pinnæ dorsalis elongato.*

Silvery-blueish elongated Herring, with rose-coloured abdomen, subhexagonal scales, and the last ray of the dorsal fin elongated.

Clupea cyprinoides.

C. radio ultimo dorsali longissimo, pinna ani lunata. *Bloch. t.* 403.

THIS is a species of very large size, arriving sometimes, according to Marcgrave, at the length of twelve feet, and having a mouth of sufficient width to receive a man's head: the general shape of the fish is not unlike that of a Pike: the lower jaw is longer than the upper, and the lips or side-plates pretty strongly curved: the eyes moderately large: the scales very large, and approaching to a slightly hexagonal form: the general colour is a silvery blue, tinged with dusky on the back, and with rose-colour on the abdomen, which is smooth or not serrated: the dorsal fin is distinguished by the same particularity as in the Clupea Thrissa, being slightly scaled at the base, and terminating behind in a strong and greatly lengthened ray, arching over the lower part of the back, and reaching almost to the base of the tail, which, as in the former species, is strongly forked: all the fins are of a pale blue colour. This gigantic species is a native of the Indian and American seas: it is not much esteemed as a table fish, except when young, the flesh of the larger ones being coarse and insipid.

SILVER-STRIPED HERRING.

Clupea Atherinoides. *C. fusca, fascia utrinque longitudinali argentea.*

Brown Herring, marked on each side by a longitudinal silvery band.

Clupea atherinoides. *C. linea laterali argentea. Lin. Syst. Nat.*

Clupea stria longitudinali argentea. *Bloch. t.* 408. *f.* 1.

LENGTH about ten inches: shape lengthened, and the habit or general appearance greatly resembling that of an Atherine: colour brown, with a broad and well defined silvery band running from the gills to the tail: scales large: abdomen carinated as far as the vent by a series of dilated scales: snout obtuse: upper jaw longer than the lower: dorsal fin placed at some distance beyond the middle of the back: tail lunated: anal fin shallow and of considerable extent: ventral fins very small. Native of the Indian and American seas, and sometimes found in those of Europe.

BRISTLED-JAWED HERRING.

Clupea Setirostris. *C. maxillæ superioris ossiculis lateralibus setaceis, pinna ani radiis triginti duobus. Lin. Gmel. p.* 1407. *Brousson. ichth. fasc.* 1. *t.* 11.

Clupea Bealama. *Forsk. Arab. p.* 72.

Herring with the lateral bones of the upper jaw terminating in a setaceous process.

SHAPE lanceolate: colour silvery, tinged with blue above: head short; mouth wide: scales ob-

scurely rhomboid, deciduous, and disposed in obliquely imbricated rows: fins grey: tail forked: native of the Indian and Red seas.

DORAB HERRING.

Clupea Dorab. *C. pinnis ventralibus minutis, labio superiori dentibus porrectis bicorni, inferiori longiori, dentibus validioribus, erectis. Lin. Gmel. Forsk. Arab.*

Herring with minute pectoral fins, upper jaw horned by prominent teeth, and lower furnished with strong upright teeth.

SHAPE linear: colour silvery, tinged with dusky blue above: head flattish: upper jaw furnished in front with exserted teeth, standing remote from each other, and of which the two middle ones are larger than the rest and very sharp: gill-covers marked by rivular stripes: scales rounded and deciduous: dorsal fin placed considerably beyond the middle of the back: ventral fins very small: tail forked. Native of the Red Sea: observed by Forskal.

TUBERCULATED HERRING.

Clupea Tuberculata. *C. mandibulâ inferiore breviore, rostro apice tuberculo verrucæformi, macula miniata ad superiores branchiarum commissuras. Commerson. Cepede. 5. p. 460.*

Herring with the lower jaw shorter than the upper, a wart-like prominence on the snout, and a red spot at the upper commissures of the jaws.

A VERY small species: colour silvery, with a slight tinge of blue above: mouth wide: dorsal fin

and tail rufous: scales easily deciduous: lateral line wanting: tail forked. Native of the Indian seas: observed by Commerson: said to be an excellent table fish.

YELLOW-FINNED HERRING.

Clupea Chrysoptera. *C. argentea, supra cœruleo-nebulosa, pinnis luteis, cauda furcata.*

Silvery Herring, clouded above with blue, with yellow fins, and forked tail.

Clupea chrysoptera. *Cepede.* 5. *p.* 460.

Size of a Sprat or very small Herring: colour silvery, clouded above with blue and white: head shaped like that of an Anchovy: gill-covers of a gilded cast: on each side the body a black spot: all the fins yellow: tail forked. Native of the Indian seas: observed by Commerson.

BANDED HERRING.

Clupea Fasciata. *C. argentea, supra fasciis semidecurrentibus fuscis, subtus maculis rotundatis.*

Silvery Herring, marked above by semidecurrent dusky bands, and below by rounded spots.

Clupea fasciata. *Cepede.* 5. *t.* 460.

Colour silvery, marked above by several semidecurrent dusky bands; and beneath the lateral line by several small rounded spots: scales so deciduous that the fish is often seen nearly naked: eyes very large: first ray of the dorsal fin prolonged

into an extended filament: ventral fins placed pretty near the thorax: tail forked. Native of the Indian seas: observed by Commerson.

NASAL HERRING.

Clupea Nasus. *C. argentea, dorso cœrulescente, naso obtuso, prominente, radio ultimo pinnæ dorsalis elongato.*
Silvery Herring with obtuse, prominent snout, and the last ray of the dorsal fin elongated.
Clupea Nasus. *C. maxilla superiore prominente, &c. Bloch. t.* 429.

Length about seven or eight inches: shape not unlike that of a Carp: snout blunt, rounded, and projecting, so that the mouth appears placed beneath: colour silvery, with a dusky blueish tinge above: scales large and rounded: dorsal fin of similar shape with that of the *C. Thrissa*, and terminated behind by a long filament: tail forked. Native of the Indian seas, and sometimes observed in rivers: in no esteem as a food, being considered as unwholesome.

LONG-HEADED HERRING.

Clupea Macrocephala. *C. argentea, supra cœrulescens, capite elongato, maxilla superiore longiore, pinnis rubentibus.*
Silvery Herring, blueish above, with lengthened head, upper jaw longer than the lower, and reddish fins.
Clupea macrocephala. *Cepede.* 5. *p.* 460.

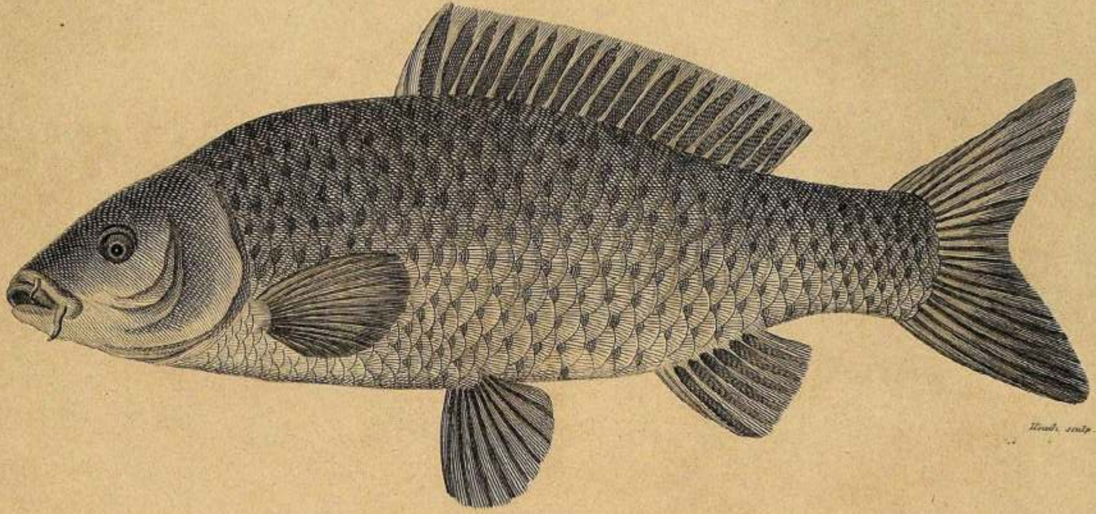
Shape lengthened: head long, equalling about a sixth of the whole fish: upper lip extending be-

yond the lower: scales large and rounded: dorsal fin placed rather beyond the middle of the back: tail forked: colour of the whole fish silvery, with the upper parts blue, and the fins reddish. Described by Cepede from a drawing by Plumier. Native of the American seas.

TROPICAL HERRING.

Clupea Tropica. *C. alba, abdomine serrato, cauda cuneiformi.*
White Herring, with serrated abdomen, and cuneiform tail.
Clupea tropica. *C. cauda cuneiformi. Lin. Syst. Nat.*

Shape broad or carp-like: mouth wide: abdomen serrated: gill-covers coated with small scales: lateral line strait, but nearer the back than the abdomen: native of the Indian seas.



COMMON CARP.

1804, June 1. London, Published by G. Kearsley, Fleet Street.

CYPRINUS. CARP.

Generic Character.

Os parvum, edentulum. Dentes gutturales.	*Mouth* small and toothless. Teeth in the throat.
Membr : branch : triradiata.	*Gill-membrane* three-rayed.
Pinnæ ventrales sæpius novemradiatæ.	*Ventral fins*, in general, nine-rayed.

Of a broad or deep shape.

COMMON CARP.

Cyprinus Carpio. *C. luteo-olivaceus, pinna dorsali lata, radio tertio postice serrato.*

Yellowish-olive Carp, with wide dorsal fin, with the third ray serrated behind.

Cyprinus Carpio. *C. pinna ani radiis novem, cirris quatuor, pinnæ dorsalis radio secundo postice serrato. Lin. Syst. Nat. p.* 525.

Carp. *Will. Pennant, &c. &c.*

THIS fish is a native of the Southern parts of Europe, inhabiting lakes and small rivers, and differs considerably in size and colour according to the waters in which it is found. From the south of Europe it has been gradually dispersed into the more northern parts, and is said to have been introduced into our own country about the year

1514, and into Denmark in the year 1560. It is said to decrease in size the farther it is removed into a northern region. The usual length of the Carp in our own country is from about twelve to fifteen or sixteen inches; but in warmer climates it often arrives at the length of two, three, or four feet, and the weight of twenty, thirty, or even forty pounds. Its general colour is a yellowish olive, much deeper or browner on the back, and accompanied with a slightly gilded tinge on the sides: the scales are large, rounded, and very distinct: the head is large, and the mouth furnished on each side with a moderately long cirrus or beard, and above the nostrils is a much smaller and shorter pair: the lateral line is slightly curved, and marked by a row of blackish specks: the fins are violet-brown, except the anal, which has a reddish tinge: the dorsal fin is broad or continued to some distance from the middle of the back towards the tail, which is slightly forked, with rounded lobes.

The usual food of the Carp consists of worms and water-insects: it is a fish so tenacious of life that it may be kept for a very considerable time in any damp place, though not immersed in water, and it is said to be sometimes fattened with success by being enveloped in wet moss, suspended in a net, and fed at intervals with bread steeped in milk, taking care to refresh the animal now and then by throwing fresh water over the net in which it is suspended.

The Carp is an extremely prolific fish, and the quantity of roe is so great that it is said to have

sometimes exceeded the weight of the emptied fish itself when weighed against it.

The age to which the Carp arrives is very great, nd several well authenticated instances are adduced its arriving at that of considerably more than a ntury at least. Many of those which were introduced into the ponds at Versailles, &c. in the reign of Lewis the fourteenth are either still in being, or at least were so a very short time before the French Revolution. Dr. Smith, in his *Tour to the Continent*, mentions these, and observes that they were grown white through age. Buffon assures us that he had seen, in the fosses at Pontchartrain, carps which were known to be of the age of an hundred and fifty years. Others affirm that they have been known to arrive at the age of two hundred years.

The Carp is commonly supposed to have been introduced into this country so lately as the reign of King Henry the eighth: it is however more than probable that it must have been known at an earlier period, since, as Mr. Pennant observes, it is mentioned by Juliana Barnes in her well-known work the "*Boke of St. Albans*," the earliest publication of which is in the year 1496.

The Carp is chiefly cultivated in some parts of Germany and Poland, where it forms a very considerable article of commerce; the merchants or dealers purchasing the fish of the noblesse, who draw a good revenue from the produce of their ponds. The method of feeding and managing carp on this large scale is thus detailed by Dr. Forster in the Philosophical Transactions.

" It would be needless to speak of the natural history of this well-flavoured fish, after the satisfactory account given of it in the British Zoology by tha most accurate zoologist Mr. Pennant. I will onl observe that though the carp is now common found in ponds and rivers, and generally thoug to be a fresh-water fish, the ancient zoologists ranged it among the sea-fish; and I know instances of its being caught in the harbour of Dantzig, between that city and a little town called Hela, which is situated at the extremity of a long, narrow, sandy promontory, projecting eastwards into the sea, and forming the gulf before Dantzig, of about 30 English miles diameter. These carp were forced, as I suppose, by a storm from the mouth of the Vistula, which here enters the Baltic, into the sea: and as the other two branches of the Vistula or Weixel disembogue into a large fresh-water lake called the Trish-Haff, which has a communication with the sea at Pillau, it is equally probable that these fish came round from Pillau to the harbour of Dantzig; especially as they are frequently found in the Trish-Haff."

" The sale of carp makes a part of the revenue of the nobility and gentry in Prussia, Pomerania, Brandenburgh, Saxony, Bohemia, Mecklenburgh, and Holstein; and the way of managing this useful fish is therefore reduced in these countries into a kind of system, built on a great number of experiments, made during several generations, in the families of gentlemen well skilled in every branch of husbandry."

"The first thing which must be attended to, in ·ase a gentleman chooses to have carp-ponds, is to ·lect the ground where they are to be made: for ·on the soil, water, and situation of a pond the cess in the management greatly depends. The ·t kind of ponds ought to be situated in a well-·nanured, fertile plain, surrounded by the finest pastures and corn-fields of a rich black mould, having either mild or soft springs on the spot, or a rivulet that runs through the plain. The water ought to be mild and soft; by no means too cold, or impregnated with acid, calcareous, or selenitic, or other mineral particles. The exposure must be sheltered against the cold, blasting, easterly, or northern winds, by a ridge of hills, situated at some distance from the pond, enjoying fully the benign influence of the sun, far from any thick, shady wood, that might intercept the beams of the sun or where the leaves of trees might cause a putrefaction, or impregnate the water with astringent particles. Such ponds as are surrounded by poor, cold and stiff soils, are open to the east and north winds, have a wood on one or two sides, and hard or cold water, or such as issues from mines, moors, or mosses, are inferior in goodness. Ponds in a poor, dry, or sandy soil, surrounded by pines or firs, with the just-mentioned inconveniences, are considered as the worst of all. The ground towards the pond ought to have a gentle slope; for deep vallies are subject to great floods, and will then endanger the dikes in a wet rainy season; and often the expectations of many years are carried away. The soil

cannot be altered: it is therefore a chief qualification of a pond to be contrived in a good soil The sun is a less material article; provided ther fore a pond can enjoy the morning and noon-ti sun, it matters not much if the wood be on one two of its sides. The water is a material poi but in case the springs that supply the ponds a very cold and hard, it may be softened and tempered by exposing it to the sun and air in a large reservoir above the pond, or by leading it for a long way in an open exposure, before it enters the pond. The quantity of water to supply the pond with, is another requisite: too much water makes too great a canal necessary, for carrying its superfluity off; and this is very expensive: too little water has another inconvenience, viz. that of keeping the water too long in the pond, and to cause a stagnation without any fresh supplies; and often, in a dry season, the scantiness of fresh water distresses the fish, and causes diseases and mortality among them. These remarks are general, and must be applied to all ponds: I shall now enter into a more minute detail: it is found by experience most convenient to have three kinds of ponds for carp: the first is called the spawning-pond, the second the nursery, and third or largest the main-pond. There are two methods for stocking the ponds with carp; either to buy a few old fish, and to put them into the spawning-pond, or to purchase a good quantity of one year's old fry, for the nursery. I shall treat of both these methods, and shall add something relative to the management of carp in the main-pond.

A pond intended for spawning must be well cleared [illegible]f all other kinds of fish; especially such as are of [illegible]rapacious nature, viz. pike, perch, eel, and trout: [illegible]d also of all newts or larvæ of lizards, as well as [illegible]the dytisci or water-beetles, which frequently [illegible]troy quantities of the fry, to the great loss of the [illegible]wner. A rich soil, gently sloping banks, mild springs, or a constant supply of good soft water, with a fine exposure to sun and air, are the chief requisites for a good spawning-pond. A pond of the size of about one acre requires three or four male carp, and six or eight female ones; and thus further, in proportion to each acre, the same number of males and females. The best carp for breeders are five, six, or seven years old, in good health, in full scale, without any blemish or wound, especially such as are caused by the *Lernæa Cyprini* Lin. (a kind of cartilaginous worm with fine full eyes and a long body). Such as are sickly, move not briskly; have spots, as if they had the small-pox, have either lost their scales, or have them sticking but loosely to the body, whose eyes lie deep in their heads, are short, deep, and lean, will never produce a good breed. Being provided with a set of carp such as are here described, and sufficient to stock a pond with, it is best to put them, on a fine calm day, the latter end of March, or in April, into the spawning-pond. Care must be taken that the fish be not too much hurt by being transported in a hogshead, nor put into the pond on a stormy day; for they are easily thrown upon the shallows on the sides, being weak, and harrassed by being caught, removed, and not yet acquainted with the

deep holes for their retreat in their new habitation. Carp spawn in May, June, or July, according a the warm season sets in earlier or later. At th season they swim to shallow, warm, and shelter places, where the female deposits the spawn wh the bottom is somewhat gritty about the roots grass, osier-roots, hanging branches, &c. The milter or male fish, by a natural instinct, follows the spawner, and the milt or soft roe is spread over the spawn, which thus becomes impregnated. Carp at this season are frequently seen swimming, as it were in a circle, about the same spot. The finest and calmest summer days are commonly those on which carp spawn; providence having thus made a provision for the greater security of the fry of so useful a fish; as otherwise in a stormy day the spawn would be washed towards the banks, where it would be eaten up by birds, or trampled on by men and quadrupeds, or dried up by the heat of the sun, and a whole generation of carp entirely destroyed. During the spawning-season the carp may be approached, with some degree of address, so that they will pass and repass between a person's hands held under the water, without being in the least disturbed; but if any noise, or quick motion be made, they dart away with surprising velocity. Great care must be taken, during the spawning season, to prevent the approach of all aquatic fowl, wild and tame, to the ponds; for geese and ducks not only swallow the spawn, but destroy still more of it by searching among the weeds and aquatic plants: it is therefore a general rule, to send twice a day, a man round the pound, to scare

all wild fowl, viz. swans, geese, ducks, cranes, and rons. It sometimes happens that crusians and rp, or tench and carp, being put together in a nd, and the males and females of each kind not ng in a just proportion, the different species their roe and milt, and thus produce mules or mongrel breeds. The mules between carp and crusians* seldom and slowly attain the size which carp are capable of: they are very deep, and shorter in proportion than carp, but of a very hardy nature. The mules between carp and tench partake of the nature of both fish; grow to a good size, but some part of their body is covered with the small slimy scales of a tench, while some other parts have the larger scales of a carp †: their flesh approaches nearer to that of a tench, and they are likewise of a less tender nature than the common carp: this latter kind of mule is called in Germany *Spiegel-Karpe*, or mirror-carp, the blotches with large scales being considered as mirrors. Whether these mules are capable of continuing their species I cannot affirm; never having made any experiments on the subject; nor have I heard any thing said on that head with any degree of precision, or founded on experience. In some ponds in Lancashire, I have been told by a gentleman of great worth and honour, both these kinds of mules are

* Dr. Forster supposes the fish thus named to be the same with the *rud* or *finscale* (Br. Zool. 3. p. 310). It is not very common in England, and is generally esteemed much inferior to the carp in flavour.

† The fish here alluded to is the *Rex Cyprinorum* of Bloch.

now and then found. I think it however not ad-viseable to put carp and tench, or carp and crusian in one pond, unless it be done for experimen sake; in which latter case a small pond, free fr other fish, with one or two fish of each kind, be sufficient to gratify curiosity, without debas the breed of carp in a large pond. The young fry being hatched from the spawn, by the benign influence of the sun, they are left the whole summer, and even the next winter, in the spawning-pond, in case the pond be so deep that the suffocation of the young tender fry under the ice in a severe winter is not to be apprehended, for it is by no means advantageous to take them out in the first months of their existence. If however the shallowness of the pond, its cold situation and climate, make it necessary to secure the fry against the rigours of the ensuing winter, the water of the pond must be let off; in which case the fry and old fish will gradually retire to the canal and ditches, which communicate with the hole in the middle of the pond, and a net, with small meshes, is then employed to catch both the fry and old ones. The old breeders are then separated from the fry, and both kinds put into separate ponds that are warmer, and more convenient for the wintering these delicate fish. Care must be taken to fix on a calm, mild day, at the latter end of September, for the catching of the fry out of the spawning-pond. The nurseries are the second kind of ponds intended for the bringing up the young fry. The best time to put them into the nursery is in March or April, on a fine and

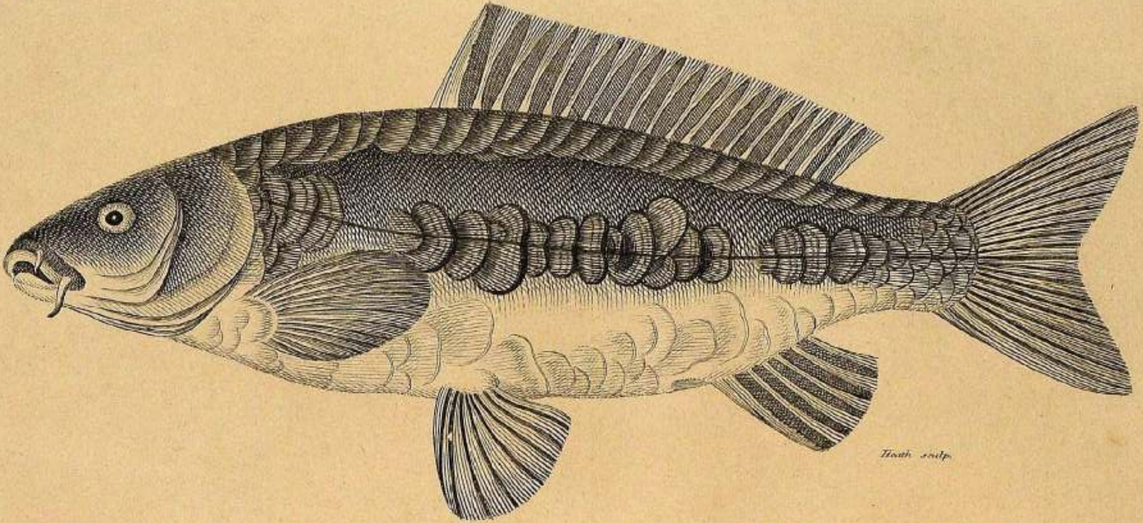
calm day. A thousand, or twelve hundred of this fry may be allotted to each acre of a pond. The choice of the fry must be made according to the above enumerated characters of good and healthy fish, and must be carefully removed from one pond to another. It is likewise requisite to send people with long sticks, all the first day, round the pond, in order to drive the tender and weak fry from the sides of the pond, because they are bewildered in a strange place, and often become the prey of rapacious birds. If the pond be good, and the place not overstocked before, and the fry well-chosen and well preserved, it is almost certain that they will grow within two summers so much as to weigh four, five, and sometimes six pounds, and to be fleshy and well-tasted. A great many Prussian gentlemen make a good profit by selling their carp, after two years standing in the nursery, and export them even to Finland and Russia. The main-ponds are the last kind. In these carp are put that measure a foot, head and tail inclusive. Every square of fifteen feet in the pond is sufficient for one carp, and will afford food and room for the fish to play in. The more room carp have, and consequently the more food the pond affords, the quicker will be the growth of the fish. The longer the pond has been already in use, the longer you intend to keep the carp in it, the more you desire to quicken the growth of them, the more you ought to lessen the number of fish destined for the pond. Spring and autumn are the best seasons for stocking your main-ponds. The growth of your fish will always

be in proportion to the food they have, for carp are observed to grow a long time, and to come to a very considerable size, and a remarkable weight. I recollect to have seen a carp above a yard long, and of twenty-five pounds weight; but I had no opportunity of ascertaining their real age. In the pond at Charlottenburg, a palace belonging to the King of Prussia, I saw more than two or three hundred carp between two and three feet long; and I was told by the keeper that they were between fifty and sixty years standing: they were tame, and came to the shore in order to be fed: they swallowed with ease a piece of white bread of the size of half a halfpenny roll.

" During winter, ponds ought to have their full complement of water; for the deeper the water is, the warmer lies the fish. In case the pond be covered with ice, some holes must be made every day for the admission of fresh air into the pond, for want of which carp frequently perish. In the summer observe to clean the rails and wire-works in the water-courses, of the weeds and grass, which frequently stop them up. Birds that feed on fish must be carefully kept out of the ponds. In a great drought, provision must be made for keeping the water at the same height that it commonly stands at in the pond; i. e. between four and five feet. If the water stagnates and grows putrid, it must be let off, and a supply of fresh water be introduced from the reservoirs. If the weeds, especially reed and flags, and some of the aquatic grasses, over-run the pond too much, scithes fixed

on poles of sixteen or twenty feet, with a lead fastened to them to keep the scithes on the bottom of the pond, are thrown out, and then again drawn to the person who works with them, and the weeds will be all cut; after which operation they must be drawn up with long harrows, and set in heaps on the shore for putrefaction, and in length of time, for manure. This cleaning of ponds must never be done in a spawning-pond, where it would be the destruction of thousands of fish. The best season for catching such carp as are intended for the market is Autumn. After the pond has been for five or six years in constant use, it is likewise time to let the water entirely off, and clear the pond of the mud, which often increases too much, and becomes a nuisance. When the pond is dry it may be ploughed before the frost sets in, and next spring oats or barley should be sown in it, after a new ploughing; and it will repay the trouble to the owner with a rich and plentiful crop. When the loose, superfluous mud is carried off, out of the pond, care should be taken not to take the soil below the original level of the pond. Some people sow a pond which has been laid for dry some months with oats; and when they are growing, they fill up the pond with water, and introduce carp for spawning; thinking by this contrivance to procure food for the fish; as well as an agreeable substance for them to rub themselves against; but this practice seems to be more noxious than beneficial: for the growing oats will putrefry, and communicate putridity to the water, which can by no means be

salutary to the fish. Epicures sometimes feed carp, during the colder season, in a cellar. The following method is the best that can be devised for that purpose. A carp is laid on a great quantity of fresh wet moss, spread on a piece of net, which is then gathered into a purse, and the moss so contrived, that the whole fish be entirely wrapped up in it: care however must be taken to give the fish ease, and not to squeeze it, so that it may have room to breathe in this confined attitude. The net, with the fish and moss, is then plunged into water, and hung up to the ceiling of the cellar. In the beginning this operation must be very frequently repeated, at least every three or four hours: by length of time the fish will be more used to the new element, and will bear to be out of water for six or seven hours. Its food is bread soaked in milk, which in the beginning must be administered in small quantities: in a short time the fish will bear more, and will grow fatter. I saw the experiment tried in a nobleman's house in the principality of Anhalt-Dessau; and during a fortnight I visited myself, every day, the fish, which after it had been kept in this manner during a fortnight, was dressed and served up at dinner, when every one present found it excellent in its flavour."



Heath sculp.

LARGE-SCALED CARP.

1804 June 1. London. Published by G. Kearsley Fleet Street.

Var.

LARGE-SCALED CARP.

This variety, which occurs in some parts of Germany, is figured by Bloch under the title of *Rex Cyprinorum*. In shape and colour it resembles the common Carp, but is distinguished by the extraordinary magnitude of the scales, which are often so large as nearly to equal the size of a half-crown piece: they are also placed rather irregularly on the fish, some parts of which appear bare, while the others are covered by the broad plates or scales before-mentioned: in general they are disposed in two rows on each side, one parallel with the back, and the other with the abdomen, which part is covered by others disposed in a less regular manner. This variety is said to be superior to the common Carp in point of flavour, and often grows to a great size. The young are observed to exhibit the same proportional size and disposition of scales with the full-grown animals, for which reason Dr. Bloch is inclined to suppose this fish to be really distinct from the common Carp.

Var.?

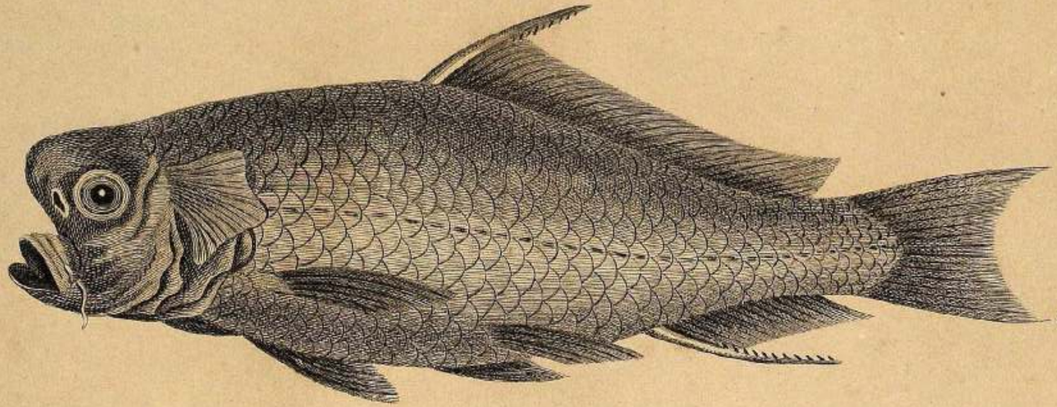
RONDELETIAN CARP.

Cyprinus Rondeletii. *Nat. Misc. vol.* 14. *t.* 556.
Cyprini mira species. *Rondel. aquat.* 2. *p.* 155.
Spur-Fish. *Edw. glean. pl.* 282.

THIS singular variety seems to have been first described by Rondeletius, from a living specimen brought into the fish-market at Lyons at the time his work was printing.

"No one," says he, "who saw the fish (supposing the head taken away), would imagine it to be any thing but a Carp, which it exactly resembles in the shape and colour of its scales, and situation of the fins and tail. The dorsal fin at its commencement has a strong serrated spine, as in the Carp, and a similar one at the commencement of the vent-fin, which latter, as also the tail, is of a reddish colour, and shaped like that of a Carp: at the gills are two fins, and likewise two at the abdomen: the head is not stretched forwards as in the Carp, but resembles that of a Dolphin *, having a longish but obtuse snout, as represented in the figure: from the upper part of the snout, on each side the opening of the mouth, hangs a fleshy appendix or beard, as in the Carp, and above this, on each side, is a much smaller one, scarce perceptible without close inspection."

* Meaning the true Dolphin, or *Delphinus Delphis.*



RONDELETIAN CARP

1804. May 10. London. Publish'd by G. Kearsley Fleet Street.

Other varieties, still more remarkable, are figured by Aldrovandus, &c. having the head sloped off in front in such a manner as to bear a rude resemblance to a human face. These varieties Dr. Bloch imagines to be entirely accidental, and to have arisen from a wound casually inflicted by some sharp instrument, as a scythe or sickle, &c. employed for the purpose of cutting weeds, while the fish was lying near the edge of the water.

CRUSIAN.

Cyprinus Carassius. *C. luteo-olivaceus, pinnis subviolaceis, linea laterali recta, cauda subintegra.*

Yellow-olive Carp, with subviolaceous fins, strait lateral line, and nearly even tail.

Cyprinus Carassius. *C. pinna ani radiis decem, caudæ integra, linea laterali recta. Lin. Syst. Nat. p.* 526.

Cyprinus linea laterali recta, pinna ani radiis decem. *Bloch. t.* 11.

Crusian. *Penn. Brit. Zool.*

Length from eight to ten inches: shape very deep, with a considerable thickness: colour deep olivaceous yellow, with a slight silvery tinge on the abdomen: lateral line strait: fins dull violet: dorsal fin broad, and extending a considerable distance from the middle of the back towards the tail, which is slightly lunated, with obtuse lobes. Native of many parts of Europe, inhabiting ponds and large stagnant waters. It may be doubted whether it be a genuine native of our own country, but is extremely common, and not much esteemed

as a food, being considered as a coarse fish*. According to Dr. Bloch a hybrid breed often takes place between this species and the Carp, when they happen to inhabit the same waters.

BREAM.

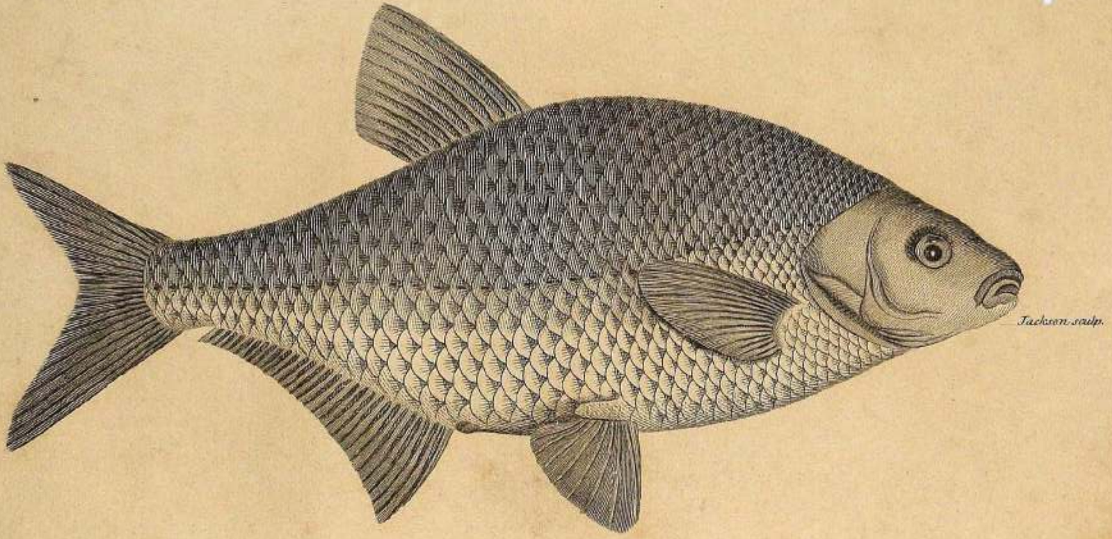
Cyprinus Brama. *C. latus olivaceus, abdomine carneo, pinna dorsali parva, ani radiis viginti-septem.*

Broad olivaceous Carp, with flesh-coloured abdomen, smallish dorsal fin, and twenty-seven rays in the anal fin.

C. Brama. *Lin. Bloch. t.* 13. *Penn. Brit. Zool.*

A LARGE species: shape very broad or deep: length from two feet to two and a half: colour olive, with a pale or flesh-coloured tinge on the under parts: scales rather large: dorsal fin rather small, and situated a little beyond the middle of the back: anal fin extending from the vent nearly to the tail, which is pretty deeply forked: at the base of the ventral fins, on each side, an oblong conical process. Native of many parts of Europe, inhabiting the larger kind of lakes, still rivers, &c. and sometimes seen in the Caspian sea. It is a fish but little esteemed for the table, being considered as coarse and insipid.

* This is the case in our own country, but, according to Dr. Bloch, it is in considerable esteem in many parts of Germany. Like many other fishes, it probably differs considerably in flavour according to the nature of the waters in which it is found.



BREAM.

1804 May 10 London Publish'd by G. Kearsley Fleet Street.

GIBEL.

Cyprinus Gibelio. *C. latus flavescens, dorso olivaceo, squamis magnis, pinna dorsali lata, cauda lunulata.*

Broad yellowish Carp, with olivaceous back, large scales, broad dorsal fin, and lunulated tail.

Cyprinus Gibelio. *C. pinna dorsali radiis novendecim, cauda lunulata. Bloch. t. 17.*

Allied in habit to the Bream, Crusian, &c. being very deep and thick: length from ten to twelve inches: general colour yellowish, with olive-coloured back: scales very large: dorsal fin moderately wide, or extending to some distance from the middle of the back towards the tail, which is short, and slightly divided, with obtuse lobes. Native of Germany and other midland parts of Europe, inhabiting lakes and rivers, and not often exceeding the weight of half or three quarters of a pound.

RUD.

Cyprinus Erythrophthalmus. *C. subaureo-olivaceus, dorso obscuriore, oculis rubentibus, pinnis rubris.*

Slightly gilded olivaceous Carp, with brownish back, reddish eyes, and red fins.

Cyprinus erythrophthalmus. *C. pinna ani radiis quindecim, pinnis rubris. Lin. Syst. Nat.*

Cyprinus latus, iride crocea, pinnis ventralibus, ani, caudæque cinnabarinis. *Bloch. t. 1.*

Rud. *Penn. Brit. Zool.*

General length about eight or ten inches: head small: irides orange: back arched, and sloping

pretty suddenly towards the head and tail: scales large: lateral line slightly curved: general colour pale gilded olive, deeper or browner on the back: abdomen reddish: fins deep red: dorsal fin rather small, and placed beyond the middle of the back: tail forked. Native of several parts of Europe, where it is extremely plentiful in lakes and rivers with a gravelly bottom. In our own island it is found, according to Pennant, in the Cherwell near Oxford, in the Witham in Lincolnshire, and in the fens in Holderness.

ROACH.

Cyprinus Rutilus. *C. argenteo flavescens, dorso subfusco, linea laterali deorsum curvata, pinnis inferioribus rubris.*

Yellowish-silvery Carp, with brownish back, lateral line curving downwards, and red lower fins.

Cyprinus Rutilus. *C. iride pinnisque omnibus rubris, ani radiis duodecim. Bloch. t. 2.*

Roach. *Penn. Brit. Zool.*

Much allied to the Rud, but of a shape somewhat less deep, and moderately thin, with the back pretty sharply arched: scales large and easily deciduous: lateral line curving pretty much towards the abdomen: general colour silvery with a cast of dull yellow, growing more dusky or brownish on the upper parts: fins red: dorsal fin rather small, and situated on the middle of the back: tail slightly forked.

The Roach is a gregarious fish, and is a native of most of the middle parts of Europe, inhabiting

deep, still, and clear rivers, and frequently appearing in large shoals. Dr. Bloch informs us that on draining the marshes about the Oder, so great a quantity were taken that they were used about all the neighbouring villages for the purpose of fattening swine.

In Walton's well-known work the Complete Angler, mention is made of a Roach weighing two pounds; and Mr. Pennant speaks, on the authority of an intelligent fishmonger, of one which weighed five pounds; but the general weight of the fish is scarcely more than a pound or a pound and half. It is considered in many parts of Europe as an excellent fish for the table, having a white, firm, and well-tasted flesh. In our own country however it is not held in any great repute, being rather regarded as a coarse fish. It generally spawns about the middle of May, and is a very prolific species. It is also said to have the habit of hiding itself in the bottom the instant it perceives any one near the water. The shoals are observed to be generally preceded by one, or more, apparently stationed as a kind of guard, in order to warn the main body of the approach of any danger.

BORDELIERE.

Cyprinus Blicca. *C. argenteo-olivaceus, dorso subfusco, pinna dorsali parva, pectoralibus ventralibusque rubentibus.*

Silvery-olive Carp, with brownish back, smallish dorsal fin, and reddish pectoral and ventral fins.

Cyprinus Blicca. *C. latus, pinnæ ani radiis viginti-quinque. Bloch. t.* 10.

Length about ten inches: shape like that of the Bream: colour also similar: dorsal fin rather small, and placed nearly in the middle of the back, or not so low as in the Bream: anal fin of similar shape to that of the Bream, being continued for a considerable distance from the vent towards the tail, which is forked: head small, with a sharpish snout, the upper lip projecting slightly over the lower: scales moderately large: lateral line curving towards the abdomen: pectoral and ventral fins reddish; the rest blueish. Native of many parts of Germany, inhabiting lakes and still rivers: in no great request as a food, on account of its numerous bones, and want of substance; it is a very prolific fish, usually spawning in the month of May, at which period it is so intent on depositing its ova in proper situations, as to suffer itself to be easily taken by the hand. Like most others of this genus, it lives on worms, water-insects, and the spawn of other fishes, and, as it is said, on that of the Rud in particular.

SOPE.

Cyprinus Ballerus. *C. argenteo-cærulescens, dorso obscuriore, pinna dorsali parva, ani lata, cauda bifida.*

Silvery-blueish Carp, with dusky back, small dorsal fin, wide anal fin, and bifid tail.

C. Ballerus. *C. pinna ani radiis quadraginta. Lin. Syst. Nat. Bloch. t. 9.*

LENGTH ten or fifteen inches: shape allied to that of the Bream, &c. but less deep: head rather small than large: gill-covers bright silvery, forming the appearance of very large scales towards the sides of the head: body covered by middle-sized scales: colour silvery, with the back dusky, or blueish: fins blueish, with a slight cast of dull red: dorsal fin rather small, and situated a trifle beyond the middle of the back; anal fin broad, or extending from the vent nearly to the tail, which is forked, with the lower lobe somewhat longer than the upper: lateral line nearly strait. Native of several parts of the German empire, inhabiting lakes and rivers.

POMERANIAN CARP.

Cyprinus Pomeranicus. *C. argenteus, dorso pinnisque fusco-cærulescentibus, capite convexo, cauda furcata.*

Silvery Carp, with dusky-blueish back and fins, convex head, and forked tail.

Cyprinus Buggenhagii. *C. pinnæ ani radiis novendecim. Bloch. t.* 95.

LENGTH from twelve to fifteen inches: shape moderately deep, tapering pretty suddenly towards the tail: head rather large, convex above, and sinking rather inwards towards the back: eyes large and silvery: colour of the whole fish silvery, with a blueish or dusky tinge on the upper parts and fins: scales large: lateral line slightly bending from the gills downwards, and then running strait to the tail, which is pretty sharply forked: dorsal fin small, and placed in the middle of the back: ventral fins small, and situated in the middle of the abdomen: anal fin small, and rather falcated. Native of some parts of Germany and Poland, inhabiting lakes and rivers, and often seen accompanying or preceding shoals of Breams, to which, as well as to the Sope, it is much allied, but may be readily distinguished from those fishes by the small number of rays in the anal fin.

FRINGE-LIPPED CARP.

Cyprinus Fimbriatus. *C. violaceo-fuscus, rubro punctatus, abdomine argenteo, labiis fimbriatis, cauda furcata.*

Violet-brown Carp, speckled with red, with silvery abdomen, fringed lips, and forked tail.

Cyprinus fimbriatus. *C. labiis fimbriatis. Bloch. t.* 409.

LENGTH about twelve inches: shape somewhat allied to that of the common Carp: colour above violet-brown, marked with numerous red specks: below silvery or white: scales rather large: lips deeply crenated or fringed round the margin: dorsal fin rather broad, slightly falcated, and extending a considerable distance from the middle of the back towards the tail, which is deeply forked, and, like all the rest of the fins, of a deep violet-colour. Native of India, inhabiting fresh waters, and considered as a good fish for the table.

CIRRHATED CARP.

Cyprinus Cirrhosus. *C. argenteus, dorso violaceo-fusco, labio superiore bicirrhato.*

Silvery Carp, with violet-brown back, and two beards on the upper lip.

Cyprinus cirrhosus. *C. cirrhis duobus supra labium superius. Bloch. t.* 411.

LENGTH twelve inches: shape nearly similar to that of the preceding, but rather more slender: colour silvery, with a violet-brown cast on the upper

parts: fins of similar shape and size with those of the preceding species, and of a pale or whitish colour. Native of India, inhabiting fresh waters.

FALCATED CARP.

Cyprinus Falcatus. *C. argenteus, dorso subferrugineo, capite obtuso, pinnis rubris, dorsali falcata.*

Silvery Carp, with subferruginous back, obtuse head, red fins, and falcated dorsal fin.

Cyprinus falcatus. *C. pinna dorsi anique falciformi. Bloch. t.* 412.

Size equal to that of the preceding: head rather short, large, and very obtuse, with the upper lip projecting over the lower: colour silvery, with a cast of reddish brown on the upper parts, and of yellow on the lower: scales large: fins red, and shaped as in the two preceding species, but the dorsal more deeply falcated. Native of India, inhabiting fresh waters.

AMERICAN CARP.

Cyprinus Americanus. *C. pinna ani radiis octodecim. Lin. Syst. Nat.*

Carp with thirteen rays in the anal fin.

Size and shape of the Roach: lateral line very much bowed towards the abdomen: native of the American seas: observed by Dr. Garden.

BIORKA CARP.

Cyprinus Björkna. *C. pinna ani radiis triginta quinque.* Lin. *Syst. Nat. p.* 532.
Carp with thirty-five rays in the anal fin.

Length about five inches: habit short and broad: colour silvery: scales rather large: fins cinereous: tail forked: native of the Swedish lakes: allied to the Rud and Roach: spawns in the month of June, and is in some esteem as a food.

FAREN CARP.

Cyprinus Farenus. *C. fusco-argenteus, squamis magnis subangulatis, pinnis fuscis, cauda furcata.*
Dark silvery Carp, with large subangular scales, dusky fins, and forked tail.
Cyprinus Farenus. *C. pinna ani radiis triginta-septem, iridibus flavis. Lin. Syst. Nat.*

Habit similar to that of the former species: body compressed and broad: colour dull silvery, with a dusky tinge on the upper parts: scales rather large and subhexagonal: fins dusky: anal fin very long: tail forked; the lower lobe exceeding the upper in length: native of the Swedish lakes, but, according to Artedi, considered as a rare species.

GRISLAGINE CARP.

Cyprinus Grislagine. *C. pinna ani radiis undecim, pinnis albentibus. Lin. Syst. Nat.*

Carp with whitish fins, and eleven rays in the anal fin.

Cyprinus oblongus figura Rutili, &c. *Art. syn.* 5. *spec.* 12.

Length about seven inches: shape somewhat like that of a Roach, but rather longer: colour silvery, with a dusky cast on the upper parts: irides silvery: scales large: tail forked. Native of the Swedish lakes.

BYNNI CARP.

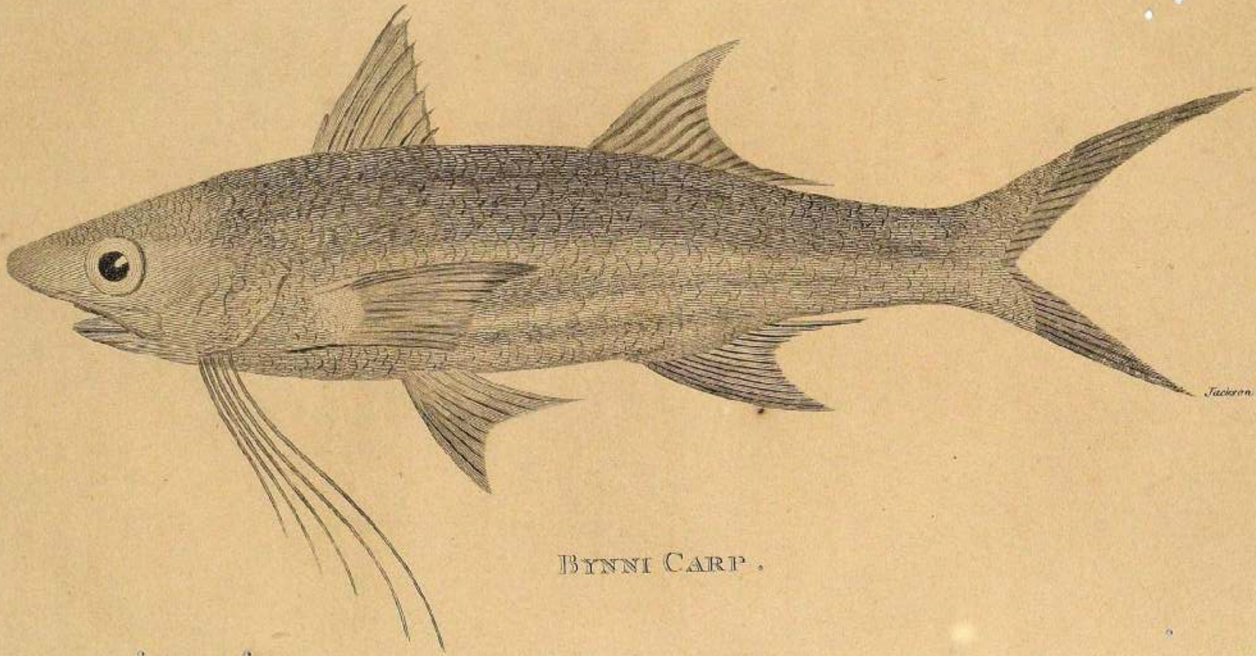
Cyprinus Bynni. *C. argenteus, cirris quatuor, cauda lineari bifida.*

Silvery Carp, with four beards, and linear bifid tail.

Cyprinus Bynni. *C. pinna dorsali radiis tredecim, tertio crasso corneo, cauda lineari bifida cirris quatuor. Lin. Gmel. Forsk. Arab.*

Length about twelve inches: shape ovate-oblong: head rather compressed: back and abdomen sloping: colour silvery: lateral line curving upwards: anal and caudal fin red with white base: the rest whitish, with a thickish dull-red margin. Native of the Nile: considered as an excellent table fish, and known to the Egyptians by the name of Bynni: perhaps confounded by some with the Binni described by Mr. Bruce, and which is evidently a species of Polynemus.

125.



Jackson sculp.

BYNNI CARP.

1804. May 10. London. Publish'd by G. Kearsley Fleet Street.

BULATMAI CARP.

Cyprinus Bulatmai. *C. pinna ani radiis octo, dorsalis secundo maximo, non serrato, cirris quatuor. Lin. Gmel. p.* 1414.

Carp with eight rays in the anal fin, the second ray of the dorsal fin very large and not serrated, and four beards at the mouth.

Size of a common Carp: general colour steel-blue, with a gloss of gold; beneath inclining to a silvery cast: scales middle-sized: head oblong, brownish above: irides of a mixed gold and silver colour: lateral line strait: dorsal fin blackish; pectoral greyish with reddish tips: ventral white at the base and red at the tips: anal red, with whitish base: tail reddish brown, and forked. Native of the Caspian sea: a rare species.

CAPOETA CARP.

Cyprinus Capoeta. *C. pinna ani radiis novem, dorsalis et analis radio tertio longissimo, illius deorsum serrato, cirris duobus. Lin. Gmel. p.* 1415.

Carp with nine rays in the anal fin, the third ray of the dorsal and anal fin very long, that of the former serrated downwards, and two beards at the mouth.

Length about twelve inches: habit similar to that of the Orf: colour silvery, with a dusky cast on the upper parts: abdomen white: scales middle-sized, and speckled with brown points: fins brown with dusky specks: dorsal fin trapezoid: pectoral acuminated: ventral opposite the dorsal, and obtusely trapezoid: anal of similar shape: tail forked. Native of the Caspian sea; entering rivers during the winter season.

TUBEROUS CARP.

Cyprinus Caucus. *C. pinna ani radiis tredecim, corpore tuberoso argenteolo.* *Lin. Gmel. p.* 1419. *Molin. Chil. p.* 198.
Carp with thirteen rays in the anal fin, and slightly silvery tuberous body.

Length about eighteen inches: colour silvery, more obscure on the upper parts. Native of the South-American seas.

CONICAL CARP.

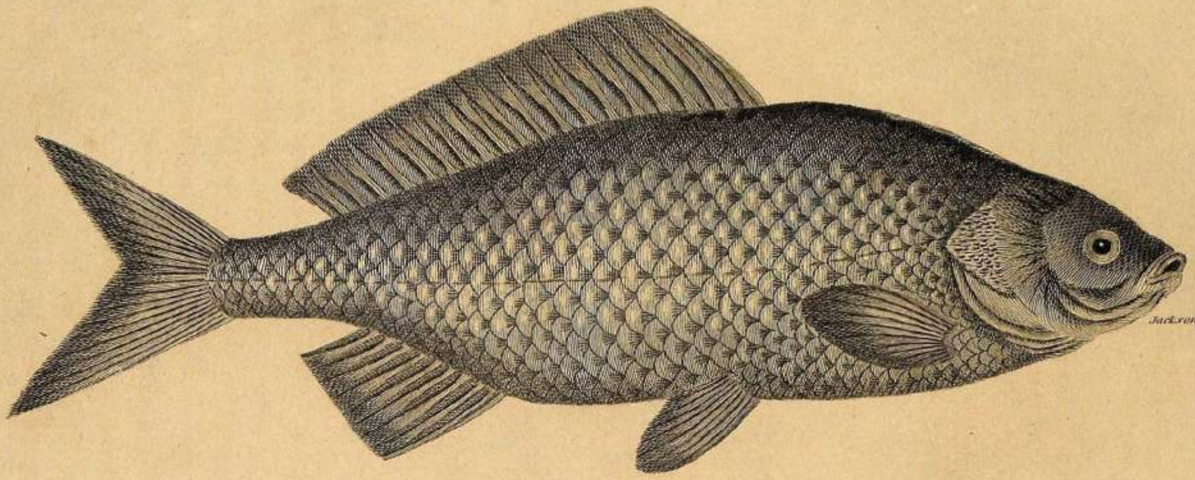
Cyprinus Malchus. *C. pinna ani radiis octo, corpore conico subcæruleo.* *Lin. Gmel. p.* 1420. *Molin. Chil. p.* 199.
Carp with eight rays in the anal fin, and conic, blueish body.

Length about twelve inches: native of the South-American seas.

LOBE-TAILED CARP.

Cyprinus Julus. *C. pinna ani radiis decem, cauda lobata.* *Lin. Syst. Nat. Gmel. p.* 1420.
Carp with ten rays in the anal fin, and lobated tail.

Length about a span: tail divided into two very distinct lobes. Native of the South-American seas.



Jackson sculp.

GOLDEN CARP.

1804. May 10 London Published by G. Kearsley. Fleet Street.

GOLDEN CARP.

Cyprinus Auratus. *C. aureus splendidissimus, pinnis rubris, cauda sæpius trifida, pinnaque ani duplici.*

Brilliant golden Carp, with red fins, tail frequently trifid, and anal fin double.

Cyprinus auratus. *C. pinna ani gemina, caudæ transversa bifurca. Lin. Syst. Nat.*

Cyprinus colore rubro. *Bloch. t.* 94.

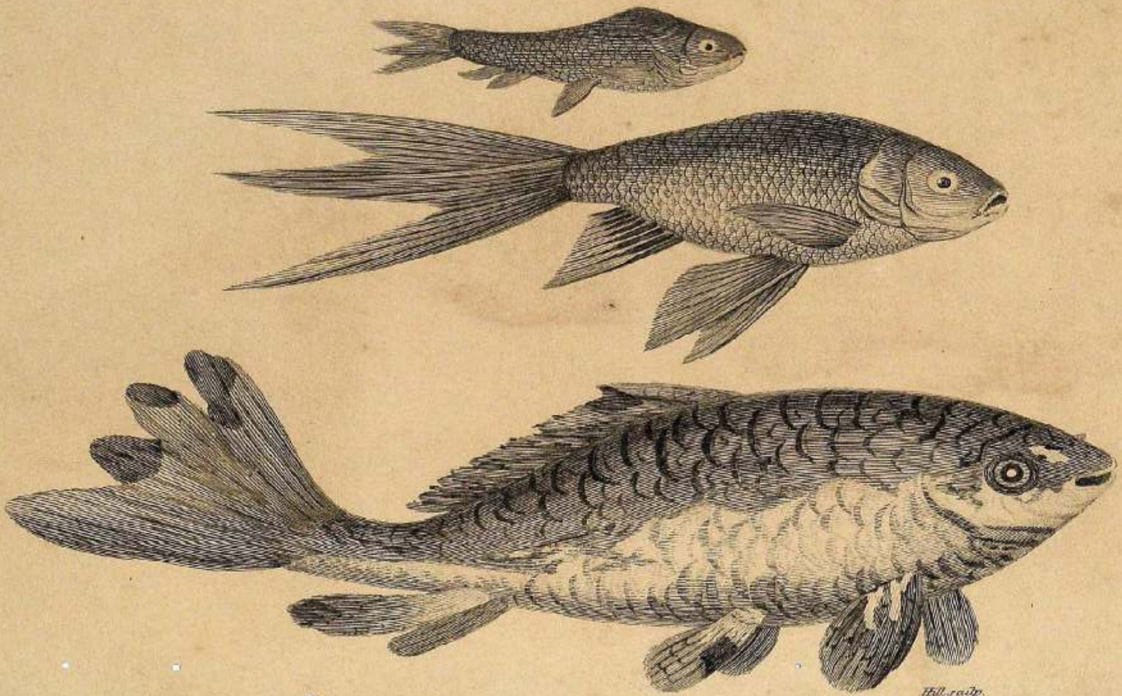
Gold-Fish. *Penn. Brit. Zool. Edwards. t.* 209.

This most beautiful fish, which far surpasses in the brilliancy of its appearance every other inhabitant of the waters, is a native of the Southern parts of China, and is particularly found in the province of *Kiang*, where it exists in its natural state in a large lake, situated near a mountain at a small distance from the town of *Tchanghou*. From this spot it has been dispersed into all parts of that extensive empire, and is justly considered as one of the most elegant ornaments which can be introduced into the gardens and houses of persons of the highest distinction. The Chinese ladies in particular are said to spare no pains in cultivating with the most assiduous attention so beautiful an animal, which pleases by the perpetual gaiety of its appearance, the liveliness of its motions, and the ease with which it may be rendered susceptible of a kind of attachment. Large glass and porcelain vessels of the richest kind are prepared for its reception in their apartments, and small ornamental ponds and basons in their gardens.

No fish is subject to so many variations, in its

domestic or cultivated state, as the Gold-Fish; not only the colour of the body, but even the form and number of the fins differing greatly in different individuals. The most general colour, in the full-grown animal, is a rich and splendid metallic golden hue, accompanied by a cast of scarlet on the upper parts, and of silver on the lower, the fins being of a bright and vivid red: in others the upper part of the fish is varied with several large black or deep blue patches: in some the colour is an irregular mixture of gold and silver, and when the animal is in a very young state it is frequently seen entirely of a black or dusky tinge; the back fin is sometimes either wanting altogether, or consists only of a very few rays united by their connecting membrane: the anal fin is very frequently double, having a similar appearance with the ventral fins: the tail, which even in its natural state is said to be often trifid, becomes still more strikingly so in the cultivated kind, and so formed as to appear horizontal, the middle part or lobe rising up between the side-parts.

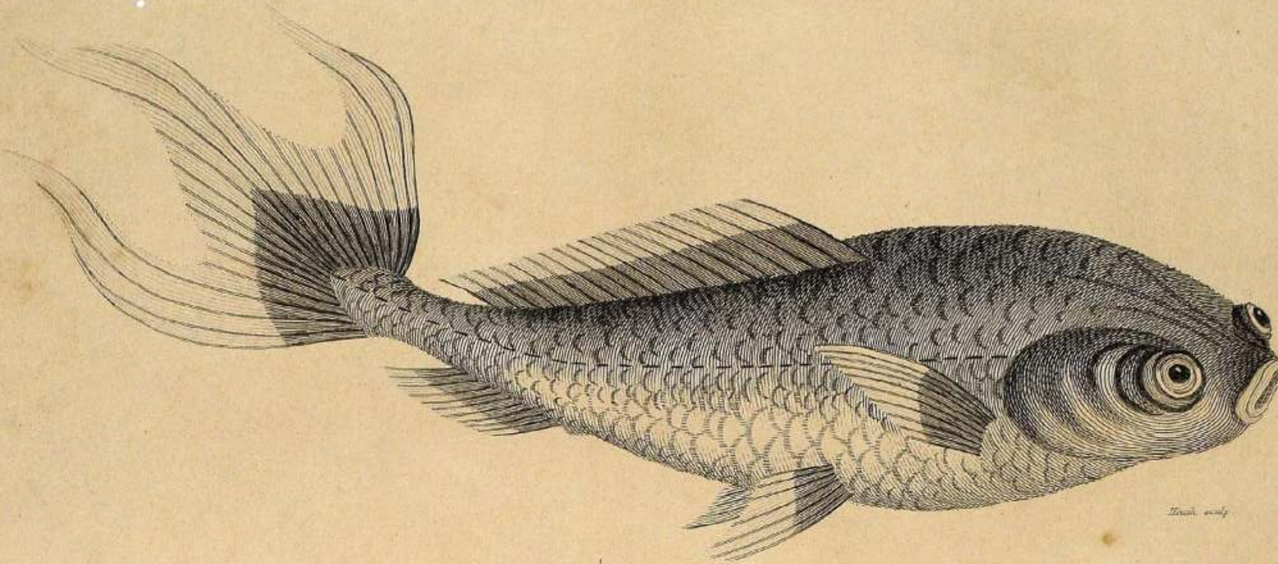
The Gold-Fish has been so long a favourite in our own country, where it now breeds with almost equal facility with the Carp, that a very particular description of the manner of keeping and feeding it becomes in a great degree unnecessary: it is nourished with fine bread-crumbs, small worms and water-snails, yolk of eggs dried and powdered, and many other substances both of an animal and vegetable nature: it should at all times, except in extreme cold weather, be supplied with a frequent



Hill sculp.

VARIETIES OF GOLDEN CARP.

1804, June 2, London Published by G. Kearsley, Fleet Street.



TELESCOPE CARP.

1804 June 1 London Published by G. Kearsley Fleet Street

change of water, and should be kept in vessels of sufficient width to permit a free access of air, yet so formed as, by curving inwards, in a proper degree, at the edge, to prevent the fish from escaping.

The Gold-Fish is said by Pennant to have been first introduced into England in the year 1691, but was not generally known till about the year 1728, when a great number were brought over, and presented to Sir Matthew Decker, and by him distributed into all parts of the kingdom. Their general length is from four to six inches; but they have been known to arrive at that of twelve or fourteen.

The Gold-Fish, like the Carp, is said to be a very longlived species. We are informed by Mr. Van Braam that, during his stay at a town near Peking, he was shewn several Gold-Fish in a small pool, of which the smallest were fifteen inches in length, and the rest a great deal larger. The Mandarins who accompanied Mr. Van Braam assured him that these fishes were all of a very great age.

TELESCOPE CARP.

Cyprinus Buphthalmus. *C. sanguineus, oculis prominentibus, pinnis omnibus dimidato-albis, cauda trifida.* *Nat. Misc.* 8. *t.* 262.

Scarlet-Carp, with protuberant eyes, all the fins half white, the tail trifid.

Cyprinus macrophthalmus. *Bloch. t.* 410.

A HIGHLY elegant species; greatly allied to the Gold-Fish: length ten inches: colour most beauti-

ful vivid sanguine red: head short: eyes extremely protuberant, and appearing in some degree extensile: fins shaped as in the Gold-Fish, and of similar colour with the body for about half their length, the remainder being of a beautiful white, with rose-coloured rays or fibres: tail very broad, transverse, and deeply trifid, the points extending to a considerable distance: scales very large. Native of China, where it is kept in a similar manner with the Gold-Fish, of which it should, perhaps, be rather considered as a variety than a truly distinct species.

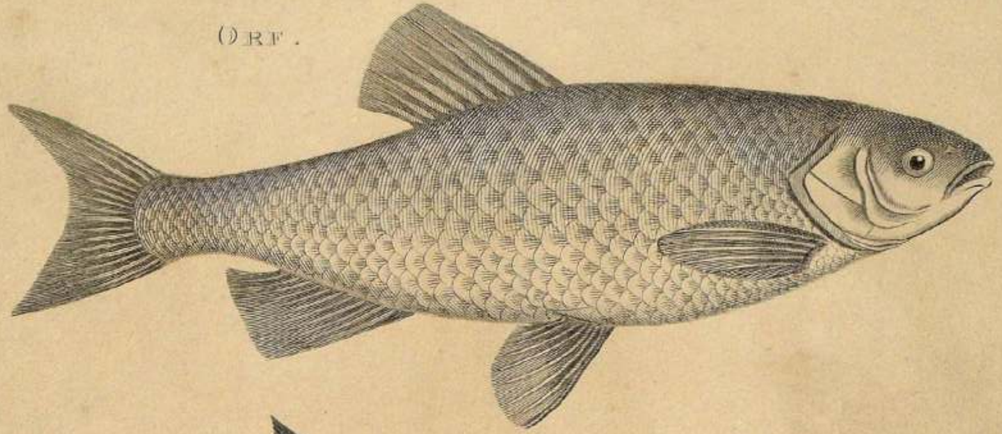
FOUR-LOBED CARP.

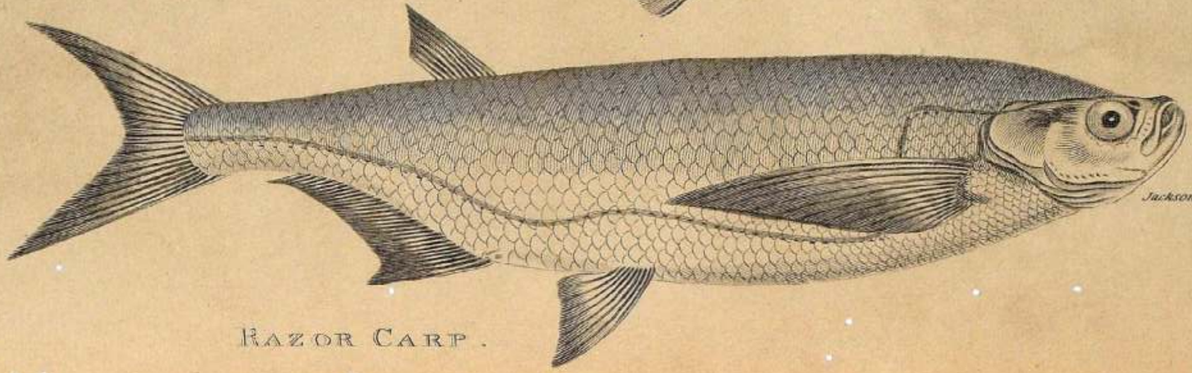
Cyprinus Quadrilobus. *C. sanguineus, pinnis roseo-albentibus, cauda quadriloba.*

Sanguine-red Carp, with whitish rose-coloured fins and four-lobed tail.

This which is described and figured in the Count de Cepede's History of fishes as a distinct species, seems rather to be a variety of the preceding, from which it chiefly differs in having the tail divided into four instead of three lobes.

ORF.





Jackson sculp.

RAZOR CARP.

1804 May 10. London Publish'd by G. Kearsley Fleet Street.

ORF.

Cyprinus Orfus. *C. croceus, abdomine argenteo, pinna dorsi parva, cauda lunata.*

Orange-coloured Carp, with silvery abdomen, small dorsal fin, and lunated tail.

Cyprinus Orfus. *C. pinna ani radiis tredecim. Lin. Syst. Nat.*

Cyprinus corpore colore croceo, pinna ani radiis quatuordecim. *Bloch. t.* 96.

A BEAUTIFUL species; allied in point of habit to the Gold-Fish, which it in some degree resembles in colour, being of a rich golden orange, accompanied by a silvery gloss, more especially towards the abdomen: all the fins are of a bright red: the dorsal fin is rather small, and placed a little beyond the middle of the back: the tail is slightly forked or lunated. Native of many parts of Germany, Russia, &c. and often kept like the Gold-Fish in small ponds on account of its beautiful appearance: length from ten to twelve inches or more.

TENCH.

Cyprinus Tinca. *C. mucosus olivaceo-nigricans, squamis minimis, cauda subintegra.*

Mucous blackish-olive Carp, with very small scales, and nearly-even tail.

Cyprinus Tinca. *C. pinna ani radiis undecim*, cauda integra, corpore mucoso, cirris duobus.* *Lin. Syst. Nat. p.* 526.

Cyprinus squamis parvis, pinnis crassis. *Bloch. t.* 14.

Tench. *Penn. Brit. Zool.*

This fish appears to be a native of most parts of the globe, inhabiting chiefly large stagnant waters with a muddy bottom, and varying considerably in the tinge of its colours according to the situation in which it resides. Its general length is about twelve or fourteen inches, but, like most other fishes, it is occasionally found of far greater magnitude, and we are told that it has sometimes been found to measure two or three feet in length, and to weigh no less than eight, ten, or even twenty pounds†. Its usual colour is a deep blackish olive, accompanied by a slight gilded cast; the abdomen being paler or yellower than the other parts, and the fins, which are thick and opake, are of a dull violet-colour: the shape of the fish is thick, and the skin is covered, like that of an Eel, with a tenacious mucus or slime, beneath which appear the scales, which are very small, and closely affixed to the

* By some mistake in the Systema Naturæ the number is said to be twenty-five.

† Salvian mentions Tenches of twenty pounds weight.

skin*: the head is rather large, the eyes small, and on each side the mouth is situated a small beard or cirrus.

The Tench, like the Carp, is remarkably tenacious of life: it is supposed by some to lie, during the winter, in a torpid state, concealed beneath the mud of the waters it inhabits, being rarely taken during that season. In the months of May and June it deposits its spawn, consisting of very small greenish ova, among water-plants, &c. It is considered as a very prolific species, and is said to be of quick growth. According to the difference, or capriciousness, of taste and fashion, the Tench is held in greater or less repute as a table-fish in different countries. In many parts of Germany it is but little esteemed; while in our own country it is considered as a very delicate fish. It varies however so much, according to the nature of the waters in which it resides, that these differences of opinion may easily be accounted for. In general, the males are firmer and richer than the females, and are therefore generally preferred. The ancients appear to have esteemed the Tench an inferior kind of fish, and it is mentioned by Ausonius in terms of contempt,

> —— virides, vulgi solatia, Tincas.
>
> Green Tenches, fav'rites at plebeian boards.

The Tench, as before observed, is sometimes found

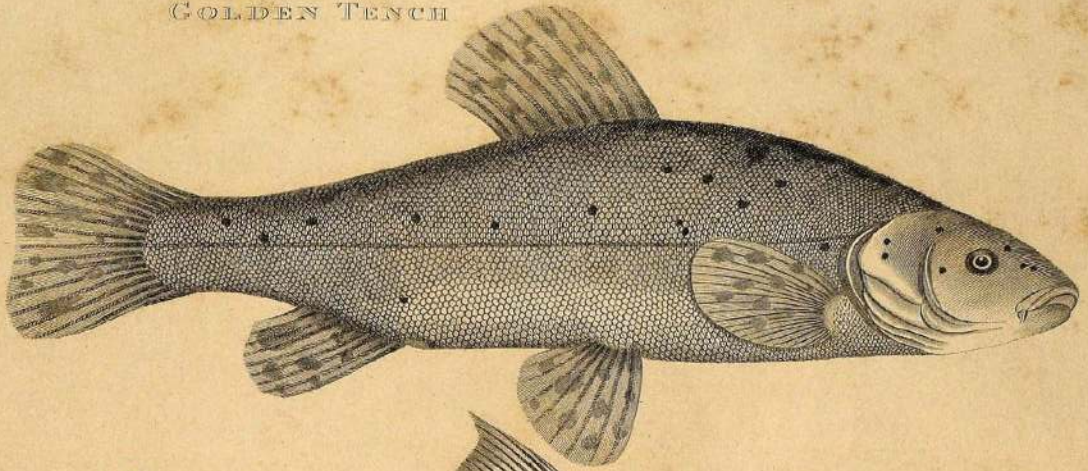
* According to Richter, the scales of the Tench amount to no less than thirty thousand.

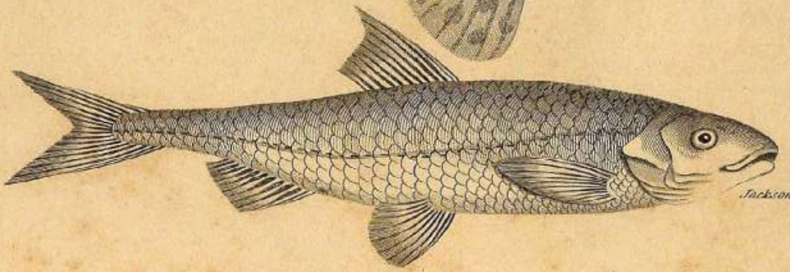
of an unusual size and weight. The most remarkable instance of this in our own country, seems to be that recorded in the second volume of Mr. Daniel's Rural Sports, the account of which runs as follows.

"The Tench that has occasioned most animadversion is that which the engraving represents *; the unusual size and form are alike impossible to be accounted for: its bulk perhaps exceeds that of any one ever known to be an inhabitant of the most extensive waters of this country, and the shape, which seems to have accommodated itself to the scanty space allotted for its residence, together stamp it a Lusus Naturæ. Its history is that a piece of water, at Thorville Royal, Yorkshire, which had been ordered to be filled up, and wherein wood, rubbish, &c. had been thrown for years, was, in November 1801, directed to be cleared out. Persons were accordingly employed, and, almost choaked up by weeds and mud, so little water remained, that no person expected to see any fish, except a few Eels, yet nearly two hundred brace of Tench, of all sizes, and as many Perch were found. After the pond was thought to be quite free, under some roots there seemed to be an animal, which was conjectured to be an Otter; the place was surrounded, and on opening an entrance among the roots, a Tench was found of a most singular form, having literally assumed the shape of the hole, in which he had of course for many years been confined. His

* See the plate opposite page 264 of the above-mentioned publication, in which a figure is given of the gigantic specimen described by Mr. Daniel.

GOLDEN TENCH





Jackson sculp.

DACE

1804 May 10 London Publish'd by G. Kearsley Fleet Street.

length, from fork to eye, was two feet nine inches; his circumference, almost to the tail, was two feet three inches; his weight eleven pounds, nine ounces and a quarter: the colour was also singular, his belly being that of a Charr, or a vermillion. This extraordinary fish, after having been inspected by many gentlemen, was carefully put into a pond; but, either from confinement, age, or bulk, it at first merely floated, and at last, with difficulty, swam gently away. It is now alive and well."

Var.

GOLDEN TENCH.

Cyprinus Tincaurea. *C. mucosus aurantius, nigro maculatus, squamis minimis, pinnis rubris pellucidis, cauda subintegra.*

Mucous orange-coloured Carp, with black spots, very small scales, red pellucid fins, and nearly even tail.

Cyprinus Tinca auratus. *Bloch. t. 15.*

This most beautiful variety, which appears to be permanent, is found in some parts of Germany, and differs from the common Tench in being of the richest orange-yellow, variegated with small black spots, while the fins are thin, transparent, and of a bright red colour: the head also in this variety is observed to be somewhat smaller than in the common Tench. It is principally found, according to Dr. Bloch, in Silesia and Bohemia, and is from thence transplanted into other parts of Europe, and kept as an ornamental fish in the waters of

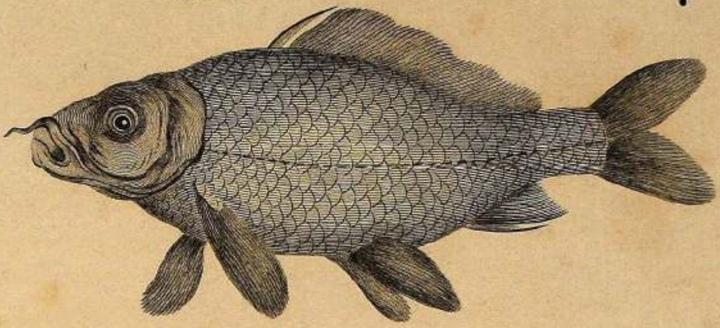
gardens and pleasure-grounds. It is said to be of slow growth, and to live, like most others of this genus, on worms, water-insects, &c. It is usual to throw into the waters in which it is kept bread-crumbs, peas, &c. in the same manner as is practised with respect to Carps. Dr. Bloch also informs us that it is usual in some places to call the Carp to the accustomed feeding-spot by means of a bell, which signal they readily obey; but that the Golden Tenches in the same water are not observed to be susceptible of the sound. They are delighted with warmth, and in bright weather are observed to swim in small shoals near the surface; and this, as is supposed, rather for the sake of warmth than of light, since when kept in a warm chamber, they are observed to prefer the shady side of the vessel in which they are placed. Like the common Carp, this variety is said to be tenacious of life. It does not appear to have been distinctly described by any ichthyological writer except Dr. Bloch.

FERRUGINOUS CARP.

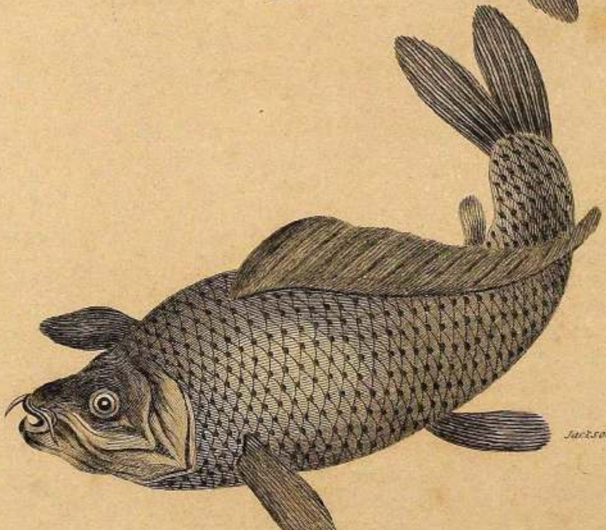
Cyprinus Ferrugineus. *C. totus ferrugineus.*
Carp entirely ferruginous or red-brown.
Cyprin rouge-brun. *Cepede.* 6. *p.* 490.

Size uncertain: habit resembling that of the Gold-Fish. Native of China.

GILDED-BLACK CARP.



FERRUGINOUS CARP



Jackson sculp.

VIOLET-GREEN CARP

GILDED-BLACK CARP.

Cyprinus Nigro-auratus. *C. nigro-auratus, pinnis ferrugineis.*
Gilded-black Carp, with ferruginous fins.
Cyprin mordoré. *Cepede.* 6. *p.* 492.

HABIT similar to that of the preceding, of which it seems rather a variety than a species truly distinct. Native of China.

VIOLET-GREEN CARP.

Cyprinus Viridi-violaceus. *C. viridi-violaceus, pinnis violaceis.*
Violet-green Carp, with violet-coloured fins.
Cyprin verd-violet. *Cepede.* 6. *p.* 492.

SIZE and habit similar to that of the two preceding. Native of China. This and the two former are slightly described, and figured by Cepede, on the authority of some Chinese drawings belonging to the collection of the Prince of Orange, and now deposited in the Parisian Museum.

PUNCTATED CARP.

Cyprinus Punctatus. *C. olivaceo-flavescens, squamis nigro-punctatis, linea laterali rubra, serie duplici punctorum nigrorum.*
Yellowish-olive Carp, with the scales speckled with black, and red lateral line with a double row of black specks.
Cyprinus bipunctatus. *Spirling. Bloch. t.* 8. *f.* 1.

A SMALL species, scarcely exceeding three or four inches in length: shape similar to that of the following species, but with the head larger, and the dorsal fin less broad in proportion: colour pale yellowish brown, or olive; white or silvery beneath: upper fins blueish: lower reddish: scales speckled with black: lateral line red, and marked throughout by a double row of black points, giving an elegant appearance to the living fish, but fading after death: tail forked. Native of Germany, inhabiting rivers and brooks, and considered as an agreeable fish for the table.

BITTERLING.

Cyprinus Amarus. *C. latus, subargenteo-flavescens, dorso olivaceo, squamis magnis nigro-punctatis, pinnis pectoralibus ventralibusque radiis septem.*
Broad yellowish-olive Carp, with a cast of silver; large scales speckled with black, and pectoral and ventral fins seven-rayed.
C. amarus. Der Bitterling. *Bloch. t.* 8. *f.* 3.

A VERY small species, scarcely exceeding two inches in length: shape resembling that of a Carp, or

rather a Bream in miniature: colour yellowish olive above, pale or whitish beneath: scales large for the size of the fish: dorsal fin placed in the middle of the back, and resembling that of a Carp in shape: anal fin of similar appearance also: tail slightly divided: all the fins of a pale yellow colour, except the pectoral, which are small, and of a pale blue. Native of Germany, and several other parts of Europe, inhabiting lakes and rivers: it is hardly considered in the light of an edible fish, being of a bitter flavour, and so small and thin as to be not worth the trouble of preparation.

SILKEN CARP.

Cyprinus Sericeus. *C. violaceo-argenteus nitidissimus, abdomine roseo, fascia utrinque longitudinali viridi-cyanea.*

Brilliant violet-silvery Carp, with rose-coloured abdomen, and a blue-green longitudinal stripe on each side.

Cyprinus sericeus. *C. pinna dorsali radiis decem, anali undecim, cauda ex fusco rubente. Lin. Gmel. Pall. it.* 3. *p.* 704.

A VERY small, but highly elegant species: length scarcely two inches: shape like that of the Crusian: colour bright silvery, accompanied by a blue or violet cast, and towards the abdomen pale rose-colour: on each side the body a longitudinal broadish blue-green stripe: ventral and anal fins bright red, tipped with black: tail brown. Native of slowly-running streams in many parts of Dauria, where, according to Dr. Pallas, it is extremely plentiful.

Of a more lengthened shape.

BARBEL.

Cyprinus Barbus. *C. albo-cærulescens, cirris quatuor, dorso olivaceo, pinnæ dorsalis radio secundo utrinque serrato.*

Blueish white Carp, with four beards, olive-coloured back, and the first ray of the dorsal fin serrated on both sides.

Cyprinus Barbus. *C. pinna ani radiis septem, cirris quatuor, pinnæ dorsi radio secundo utrinque serrato. Lin. Syst. Nat. p.* 525.

Barbel. *Penn. Brit. Zool.*

The Barbel, which is a native of most of the middle and southern parts of Europe, is readily distinguished from most others of its genus by the lengthened form of its body, somewhat resembling the habit of a Pike, as well as by the length of the upper lip, which extends considerably beyond the lower, and is furnished with two pair of long and unequal cirri or beards, of which the interior or those nearest the tip of the nose are shorter than the exterior: the colour of the whole fish is a slightly silvery grey, with a darker cast on the upper parts, and the scales are middle-sized, rounded, and well defined: the dorsal fin is rather small than large, situated on the middle of the back, and is of a blueish brown colour, with the second ray extremely strong, sharp, and serrated on both sides: the pectoral and ventral fins are pale-brown tipped with yellow; the tail dull purple and forked: the snout or upper lip reddish: the lateral line strait.

The Barbel is usually found in deep and rapid

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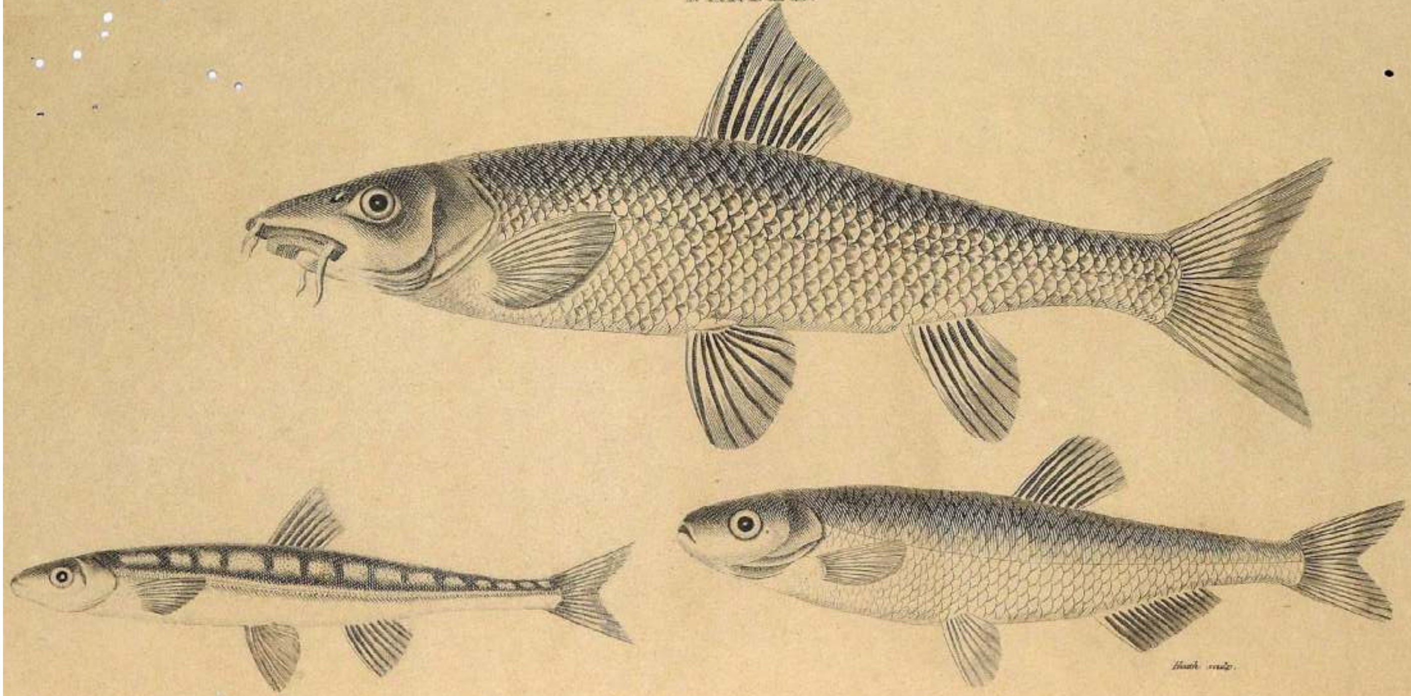
BARBEL.



MINOW.

BLEAK.

1804 June 1. London Published by G. Kearsley Fleet Street.

rivers, and is a fish of considerable strength, swimming with rapidity, and living not only on worms and water-insects, but occasionally preying on the smaller fishes. It grows to a great size, having been sometimes seen of the length of five or six, and even, according to some authors, of eight, ten, or twelve feet. Its more general length however is from eighteen inches to two feet. It is said to be of quick growth, and to arrive at a great age. It is generally observed to frequent the deeper and stiller parts of the rivers in which it resides, frequently assembling in small shoals, and rooting among the mud and stones at the bottom in quest of worms, &c. It is sometimes either so intent on this, or so careless at particular seasons, as to suffer itself to be taken by the hand by divers employed for that purpose. Mr. Pennant observes that in summer the Barbel is chiefly in motion during the night, but towards autumn, and in winter, generally confines itself to the deepest holes. It is a very coarse fish, and never admitted at superior tables, being used only by the lower ranks: it has even the reputation of being in some degree noxious; the roe in particular is said to operate as a very strong emetic and cathartic, and is sometimes taken in a small quantity by the country people for the purpose of common physick, but is observed, in general, to operate rather too roughly. We are assured, by Sir John Hawkins, in his edition of Walton's Complete Angler, that the flesh itself is not always safe. "About the month of September (says he) in the year 1754, a servant of

mine, who had eaten part of a Barbel, though, as I had cautioned him, he abstained from the spawn, was seized with such a violent purging and vomiting, as had like to have cost him his life." Notwithstanding this observation, Dr. Bloch affirms that the Barbel, when not overgrown, is a sufficiently delicate fish, and even assures us that he himself, together with his whole family, had eaten the roe or spawn without any bad effect. Like most other fishes, the Barbel probably differs very much in different situations. It usually spawns in May, or June, according to the warmth or coldness of the season. At that period it rushes up the rivers, and deposits its eggs in stony places in the most rapid part of the current. Dr. Bloch informs us that the Barbel, among other baits, is fished for with leeches, which are collected by the country people, and dried, and on immersion in water, are sufficiently restored to their natural appearance as to be used with success for this purpose.

CYRAL BARBEL.

Cyprinus Capito. *C. cirris quatuor, pinnæ dorsalis radio tertiò utrinque postice serrato, dorso acuto, lateribus pinnisque inferioribus albidis. Lin. Gmel. Guldenst. Nov. Comm. Petrop.*

Carp with four beards, sharp back, third ray of the dorsal fin serrated on both sides, and whitish lower fins.

Very much allied to the Barbel, but rather more compressed, and with a longer and broader head in

proportion: snout more obtuse; beards longer, and eyes larger: dorsal fin situated lower than in the Barbel. Found in the rivers running into the Caspian sea, particularly in the Cyrus.

RAZOR CARP.

Cyprinus Cultratus. *C. argenteo-cærulescens capite parvo, corpore compresso, abdomine carinato.*

Silvery-blueish Carp, small head, compressed body, and carinated abdomen.

Cyprinus cultratus. *C. pinna ani radiis triginta, linea laterali declinata, ventre acutissimo. Lin. Syst. Nat. p.* 531.

Cyprinus pinna dorsi anali opposita. *Bloch. t.* 37.

This species is of a lengthened form, and of a remarkably compressed shape, with the back nearly strait, the abdomen projecting downwards; and forming a sharp keel on the lower part: the head is small, with the mandibles turning upwards, and in shape resembling those of a Herring: the eyes are large and silvery: the body of similar colour, with a slight cast of dusky blue above: the scales middle-sized, thin, and deciduous, and the lateral line remarkably flexuous, descending first pretty deeply from the gill-covers, and from thence continuing with an unequal flexure to the tail, which is pretty strongly forked: the dorsal fin is small, and situated very low on the back, or at no great distance from the tail: the anal fin is shallow and subfalcated: the pectoral rather large and lanceolate, and the ventral smaller, but of nearly similar shape: all the fins are of a pale or whitish colour.

'This fish is a native of Russia, Pomerania, &c. inhabiting rivers running into the Baltic. In other parts of Europe it is rather a rare fish: it arrives at the length of eighteen inches or two feet, and is held in but slight repute as a table-fish, on account of its thinness, and the want of firmness of its flesh: it is said chiefly to frequent the banks of the rivers, to prey on worms and insects, and to spawn in the month of May.

CHUB.

Cyprinus Jeses. *C. argenteo-cærulescens, dorso olivaceo, capite crasso, rostro rotundato.*

Silvery-blueish Carp, with olivaceous back, thick head, and rounded snout.

Cyprinus Jeses. *C. pinna ani radiis quatuordecim, rostro rotundato. Lin. Syst. Nat. p.* 530.

Chub. *Penn. Brit. Zool.*

This fish in some degree resembles the Carp, or rather the Tench, in shape, but is of a more lengthened form, and has a thicker or larger head in proportion. Its general length is from fourteen to eighteen inches: its colour silvery, with a blueish olive cast on the upper parts: the scales are very large or broad, and the lateral line nearly strait: the dorsal fin is rather small, and situated on the middle of the back: the tail is slightly forked, and of a dull blueish colour, all the rest of the fins being of a ferruginous brown.

The Chub is a native of many parts of Europe, and is not uncommon in our own island: it is

chiefly found in clear and rapid rivers, being a fish of a strong nature, and swimming very swiftly: it generally frequents the deepest parts of the water, and is of a shy or timid disposition: it spawns in the months of March and April. According to Bloch, the Chub weighs from five to eight pounds: those of British growth however are very rarely equal in point of size to those found in many other parts of Europe. The young are said to be of slow growth; scarcely arriving at a greater length than three inches in the space of the first year. The Chub is generally considered as a coarse, unpalatable fish, and is apt to acquire a yellowish cast on boiling; for which reason it is held in no esteem at our tables. Walton however, in his well-known work The Complete Angler, gives us a receipt for dressing it in such a manner as to form no unpleasant repast.

"The Chub (says he), though he eat well thus drest, yet as he is usually drest, he does not: he is objected against, not only for being full of small forked bones, disperst through all his body, but that he eats watrish, and that the flesh of him is not firm, but short and tasteless. The French esteem him so mean, as to call him *Un Villain;* nevertheless he may be so drest as to make him very good meat; as namely, if he be a large Chub, then dress him thus.

"First, scale him, and then wash him clean, and then take out his guts; and to that end make the hole as little and as near to his gills as you may conveniently, and especially make clean his

throat from the grass and weeds that are usually in it, for if that be not very clean, it will make him to taste very sour: having so done, put some sweet herbs into his belly, and then tye him with two or three splinters to a spit, basted often with vinegar, or rather verjuice and butter, with good store of salt mixed with it.

"Being thus drest, you will find him a better dish of meat than you, or most folk, even than anglers themselves, do imagine; for this dries up the fluid watrish humour with which all Chubs do abound."

It seems somewhat singular in the above receipt, that Walton should first insist on the throat of the fish being well cleaned, lest it should taste sour, and then recommend it to be well basted with verjuice or vinegar.

ROUND-TAILED CHUB.

Cyprinus Cephalus. *C. pinna ani radiis undecim, corpore subcylindrico, cauda rotunduta.*

Carp with eleven rays in the anal fin, subcylindric body, and rounded tail.

Cyprinus Cephalus. *C. pinna ani radiis undecim, caudæ integra, corpore subcylindrico. Lin. Syst. Nat. p. 527.*

GREATLY allied to the Chub, but, according to Dr. Bloch, specifically different: appears to have been confounded by Mr. Pennant and others with the Chub or Cyprinus Jeses of Linnæus, from which it differs in having the tail rounded.

RAPHE.

Cyprinus Aspius. *C. griseo-argenteus, dorso subfusco, maxilla inferiore longiore incurva.*

Silvery-grey Carp, with brownish back, and incurved lower jaw longer than the upper.

C. Aspius. *C. pinna ani radiis sedecim, maxilla inferiore longiore incurva. Lin. Syst. Nat. p.* 530.

Cyprinus Aspius. *Bloch. t.* 7.

GREATLY allied in appearance to the Chub, but rather more slender, with the back less elevated, the abdomen more prominent, and the head rather smaller: colour silvery, growing dusky on the back: scales large: lateral line curving slightly towards the abdomen: fins similar in situation, shape, and colour to those of the Chub, except that the pectoral fins are whitish: the lower jaw is rather longer than the upper, slightly curving up at the tip. In the young of this species the body is often marked by a longitudinal series of dusky lines in the direction of the scales, as in the Grayling, the Mullet, and several other fishes. Native of the rivers of Germany: said to be a good table fish, but not a fashionable one, the flesh breaking in pieces on boiling, and being thought too fat for delicate stomachs. It is said to die soon when taken out of the water, in which particular it differs remarkably from the Chub.

IDE.

Cyprinus Idus. *C. argenteo-cærulescens, pinna dorsali caudaque violaceo-fuscis, cæteris rubentibus.*

Silvery-blueish Carp, with the dorsal fin and tail violet-brown, the rest red.

Cyprinus Idus. *C. pinna ani radiis tredecim, rubra. Lin. Syst. Nat. p.* 529. C. Idbarus? *Lin. Syst. Nat.*

Cyprinus corpore crasso, pinna ani radiis tredecim. *Bloch. t.* 36.

Length from eighteen inches to two feet: shape somewhat lengthened or Salmon-form, yet with a considerable degree of depth: colour silvery, with a blueish or dusky tinge on the upper parts: head rather large than small, and slighly sharpened in front: cheeks tinged with yellow: irides silvery: scales rather large: dorsal fin smallish, placed on the middle of the back, and of a pale violet-brown colour, as is likewise the tail, which is slightly forked: pectoral fins reddish: ventral and anal red. Native of lakes and rivers in many of the northern parts of Europe, ascending rivers principally in the month of May, during the spawning-season; and is observed to select for this purpose the most rapid places, and to deposit its ova on the bare stones. It is said to be of slow growth, and to be held in considerable esteem as a table fish.

NASE.

Cyprinus Nasus. *C. argenteo-cœrulescens, capite parvo naso prominente.*

Silvery-blueish Carp, with small head, and prominent snout.

Cyprinus Nasus. *C. pinna ani radiis quatuordecim, rostro prominente. Lin. Syst. Nat. p.* 530.

Cyprinus abdomine intus nigro. *Bloch. t.* 3.

Shape like that of a Salmon: length about twelve or fifteen inches: head small: snout prominent, with the mouth placed considerably beneath: scales large: colour silvery, with a strong cast of dusky blue on the upper parts: dorsal fin rather small than large, placed in the middle of the back, and of similar colour; tail forked, and of the same colour, but with a tinge of dull red: pectoral, ventral, and anal fins bright red. Native of lakes and rivers in many parts of Germany, Russia, &c. It is not held in much consideration as a table fish, from a prejudice entertained against it, on account of the black colour of the peritonæum or investing membrane of the intestines.

SERTE.

Cyprinus Serta. *C. argenteo-cærulescens, supra olivaceus, naso producto, pinna dorsali anali caudalique subcæruleis, cæteris subrubentibus.*

Silvery-blueish Carp, olivaceous above, with the dorsal, caudal, and anal fin blueish, the rest reddish, and the snout produced.

Cyprinus Vimba. *C. pinna ani radiis viginti-quatuor, rostro nasiformi. Lin. Syst. Nat.*

Cyprinus Vimba. *Bloch. t. 4.*

Length from twelve to eighteen inches: shape nearly similar to that of the preceding; but rather thicker: snout shaped in the same manner, with the mouth beneath: colour dusky blueish-olive above, silvery or whitish beneath: eyes gold-coloured: dorsal fin as in the preceding, and of the same colour with the back, as is also the forked tail, and the anal fin: pectoral and ventral fins yellow: the cheeks and gill-covers are also pretty strongly tinged with yellow: scales middle-sized, and bordered with small radii at the edges. Native of Germany, Russia, Sweden, and other parts of Europe, inhabiting rivers, from which it occasionally migrates into the Baltic sea. It is held in considerable estimation as a food, either fresh, salted, or prepared in various ways by pickling, &c. The peritonæum in this species is not black, but of a silvery whiteness; it seems however to have been confounded by some authors with the former fish, in which that part is of a deep black colour.

DOBULE.

Cyprinus Dobula. *C. argenteo-cærulescens, naso subproducto, pinna dorsali caudaque subcæruleis, pinnis inferioribus rubentibus.*

Silvery blueish Carp, with subproduced snout, dusky back, blueish dorsal fin and tail, and reddish lower fins.

Cyprinus Dobula. *C. pinna ani dorsalique radiis decem. Lin. Syst. Nat.*

C. oblongus, pinna ani dorsalique radiis undecim. *Bloch. t. 5.*

LENGTH ten or twelve inches: shape similar to that of the Nase, but with the snout much less produced, the upper jaw being but very little longer than the lower: colour as in the Nase: eyes yellow: situation, shape, and proportion of the fins the same: dorsal fin and tail dusky; pectoral pale yellow; ventral and anal red. Native of Germany, &c. inhabiting large lakes, and ascending rivers in the months of March and April for the purpose of spawning: feeds on worms, leeches, and water-insects: but little esteemed as a table-fish, on account of its numerous bones, though otherwise not an unpleasant food.

DACE.

Cyprinus Leuciscus. *C. argenteo-flavescens, dorso olivaceo, pinna dorsali fusca, cæteris rubentibus cauda furcata.*

Yellowish-silvery Carp, with olivaceous back, dorsal fin brown, the rest reddish, and forked tail.

Cyprinus Leuciscus. *C. pinna ani radiis decem, dorsali novem. Lin. Syst. Nat.*

Dace or Dare. *Will. ichth. Penn. Brit. Zool.*

Length from six to eight or ten inches: colour silvery, with yellowish olive back: scales middle-sized: dorsal fin rather small, of a dusky colour, and placed on the middle of the back: rest of the fins slightly tinged with red: tail pretty sharply forked. In its manners the Dace resembles the Roach, being of a gregarious nature, inhabiting lakes and rivers in many parts of Europe, and by no means uncommon in our own island.

GRAYNING.

Cyprinus Lancastriensis. *C. argenteus, dorso subrecto cærulescente, oculis pinnisque inferioribus rubentibus.*

Silvery Carp, with almost even, blueish back, and reddish eyes and lower fins.

Grayning. *Penn. Brit. Zool.*

This, says Mr. Pennant, is found in the Mersey near Warrington, and has much the appearance of a Dace, but is more slender, and has the back straiter: the usual length is about seven inches and a half: the depth to the length is as one to

five; of the Dace as one to four: the colour of the back is silvery with a blueish cast: the eyes, ventral and anal fins red, but paler than in the Dace, and the pectoral fins are redder: in the dorsal fin are eight rays, in the pectoral fifteen, in the ventral nine, in the anal ten, and in the tail thirty-two.

CASPIAN CARP.

Cyprinus Mursa. *C. pinna ani radiis septem, primo longissimo, dorsalis tertio longissimo, crassissimo, retrorsum ultra medium serrato, cirris quatuor. Lin. Gmel. p.* 1415. *Guldenst. Nov. Comm. Petrop.* 17. *p.* 513.

Carp with four beards, seven rays in the anal fin, the first very long, and the third ray of the dorsal fin very long and thick, and serrated beyond the middle.

Length about twelve inches: habit resembling that of a Pike, being of a squarish oblong shape: scales small, and obtusely square: colour gilded olive, shaded with dusky on the upper parts: abdomen white: skin mucous: anal and ventral fins white, spotted on the upper part with brown: the rest of the fins brown: the dorsal placed in the middle of the back, the tail forked. Native of the Caspian sea, ascending rivers in the spring season in order to deposit its ova in proper situations.

FIN-BACK CARP.

Cyprinus Regius. *C. pinna ani radiis undecim, dorsali per totam dorsi longitudinem excurrente. Lin. Gmel. p.* 1419. *Molin. Chil. p.* 198.

Carp with eleven rays in the anal fin, and the dorsal fin running down the whole length of the back.

NATIVE of the South-American seas: size of a Herring: shape cylindric: colour golden above, silvery beneath: irides purple: fins soft and yellow: in great esteem for the table, being a very delicate fish.

THICK-SNOUTED CARP.

Cyprinus Labeo. *C. subargenteo-fuscus, rostro subcarnoso conico-obtuso, pinnis inferioribus rubris, cauda fusca.*

Subargenteous brown Carp, with somewhat fleshy obtusely-conic snout, red lower fins, and brown tail.

Cyprinus Labeo. *C. pinna ani radiis septem dorsali octo, pectoralibus novendecim. Lin. Gmel. p.* 1420. *Pall. it.* 3. *p.* 703.

A LARGE species, more than two feet in length: body roundish, subcompressed, and covered with large scales: head thick, with an obtuse, conical, and somewhat fleshy snout: mouth placed beneath, as in the Sturgeon: eyes rather large, with yellowish-silvery irides: pectoral, ventral, and anal fins red: tail forked: first ray of the dorsal strong and bony. Native of rocky rivers in Dauria, where it is very common; is a very swift swimmer, and is highly esteemed as a table fish.

THIN-HEADED CARP.

Cyprinus Leptocephalus. *C. capite producto, depresso, maxilla inferiore longiore, pinnis, excepta dorsali, rubris.*

Carp with produced and depressed head, with the lower jaw longer than the upper, and red fins, the dorsal excepted.

Cyprinus leptocephalus. *C. pinna ani radiis novem, dorsali octo. Lin. Gmel. Pall. it.* 3. *p.* 703.

Size equal to that of *C. Labeo:* shape resembling that of the *Salmo Coregonus*, but the head somewhat like that of a Pike, having the snout much produced, depressed, and rounded, with the lower jaw longer than the upper: scales middle-sized: fins, except the dorsal, red. Inhabits the rivers of Dauria.

SUCKING CARP.

Cyprinus Catastomus. *C. albidus, corpore elongato, capite subtetragono, rostro subproducto, ore lunulato inferiore.*

Whitish Carp, with lengthened body, subtetragonal head, subproduced snout, and lunulated mouth placed beneath.

Cyprinus catastomus. *C. pinna ani radiis acto, labio imo caruncula bilobata papillosa, cauda bifida. Forst. Act. Angl. vol.* 63. *p.* 158. *t.* 6.

Shape lengthened; body compressed; colour whitish; length from ten to fifteen or sixteen inches: head lengthened, flattened on the top, and marked by rough lines: mouth small, and placed beneath: scales middle-sized: dorsal fin situated on the middle of the back: tail lunated. Native

of North America, inhabiting inland lakes and rivers, where it is found in the greatest plenty: said to live chiefly by suction, from which circumstance its name is taken.

VAR.

This variety has smaller scales than the former, and is farther distinguished by a broad red stripe on each side the body, accompanying the lateral line: it is found chiefly at sea, and very rarely in fresh waters.

BLEAK.

Cyprinus Alburnus. *C. argenteus, dorso olivaceo, pinna ani radiis viginti, cauda furcata.*

Silvery Carp, with olivaceous back, twenty rays in the anal fin, and forked tail.

Cyprinus Alburnus. *C. pinna ani radiis viginti. Lin. Syst. Nat.* p. 531.

Cyprinus maxilla inferiore prominente, pinna ani radiis viginti. *Bloch. t.* 8. *f.* 4.

Length five or six inches: shape slender, with the body much compressed: colour bright silvery, with the back olive-green: scales middle-sized, and easily deciduous: tail forked: native of rivers in many parts of Europe, and common in our own island. It is from the scales of this fish that the beautiful silvery matter used in the preparation of artificial pearls is chiefly taken: the invention is of

French origin, and is principally practised at Paris, which city has long been famous for this elegant manufacture: we are informed by Dr. Lister, in his Journey to Paris, that an artist in that city used about thirty hampers-full of Bleak in a single winter. Other bright-coloured fishes may however be used for the same purpose: the scales are said to be first washed, or slightly beaten, in order to afford all the silvery matter with which they are covered, and which, by repeated affusions of water, is purified, and suffered to settle for use: this preparation, which is termed oriental essence, is then mixed with a small quantity of melted isinglass, and introduced, by means of proper tubes, into the thin glass beads used in the process, and which are of different casts of colour, as pale rose, blueish, &c. &c. When the silvery matter or essence has been distributed round the whole internal surface of the bead, it is suffered to dry, and, in the ordinary kinds, is afterwards filled up with melted wax.

GALIAN.

Cyprinus Galian. *C. olivaceus, fusco-maculatus, abdomine rubro.*
Olivaceous Carp, with brown spots, and red abdomen.
Cyprinus Galian. *C. pinna ani radiis septem, dorsali octo, pectoralibus quatuordecim. Lin. Syst. Nat. Gmel.*

An elegant species: size and habit of a small Gudgeon: scales small, and closely infixed: native of rocky rivers in some parts of Siberia.

HERRING CARP.

Cyprinus Clupeoides. *C. argenteo-cærulescens, compressus, abdomine serrato, ore sursum curvato, pinna anali subfalcata, cauda furcata.*

Silvery-blueish compressed Carp, with serrated abdomen, mouth curving upwards, subfalcated anal fin, and forked tail.

Cyprinus clupeoides. *C. abdomine serrato. Bloch. t.* 408. *f.* 2.

Length about six inches: habit resembling that of a Herring: body compressed, with the abdomen sharply carinated: scales middle-sized: lateral line curving downwards from the gills, pretty near the abdomen, and then running almost strait to the tail: mouth shaped as in the genus Clupea, but having the teeth in the throat as in the Cyprini: gill-membranes also furnished with rays: colour blueish-silvery, with a dusky cast on the back, and yellowish at the base of the fins: tail forked. Native of India, and seeming to form, as it were, a connecting link between the genera of Cyprinus and Clupea.

GUDGEON.

Cyprinus Gobio. *C. argenteo-olivaceus, labio superiore utrinque barbato, pinna dorsali caudaque nigro-maculatis.*

Silvery-olive Carp, with the upper lip bearded, and the dorsal fin and tail spotted with black.

Cyprinus Gobio. *C. pinna ani radiis undecim, cirris duobus. Lin. Syst. Nat. p. 526.*

Cyprinus oblongus varius, cirris duobus ad angulum oris. *Bloch, t. 8. f. 2.*

The Gudgeon is an inhabitant of the smaller kind of lakes and gentle rivers in most parts of Europe, especially those with a gravelly bottom. It is observed by Mr. Pennant that those which are caught in the Kennet and the Cole are thrice the weight of those taken elsewhere: the largest commemorated by the above-mentioned author was taken near Uxbridge, and weighed half a pound: the general measure is from four to five or six inches. The Gudgeon is of a lengthened shape, with a thick or subcylindrical body: its usual colour is pale olive-brown above, sometimes slightly spotted with black; the sides silvery, and the abdomen white: the scales middle-sized, or rather large: and the lateral line strait: the dorsal fin is placed in the middle of the back, opposite the ventral fins, and is of a pale brown, commonly marked with numerous black spots disposed in a kind of transverse rows: the tail is slightly forked, and of similar colour: the rest of the fins are generally of a pale reddish or yellowish brown, the irides of the

eyes are red: the upper jaw rather longer than the lower, and furnished on each side with a shortish beard or cirrus. The Gudgeon is observed to reside principally at the bottom of the streams which it frequents, and it is usual with anglers to rake the bottom at intervals, by which means these fish are assembled in small shoals, expecting, on the raising of the mud, a supply of their favourite food, viz. small worms and water-insects. The Gudgeon generally spawns in the spring, and is observed not to deposit all its ova at once, but at distant periods, so that the spawning-time lasts near a month. It is a very prolific species, and is to the last degree plentiful in the lakes of some parts of Germany, where it chiefly abounds in the autumnal season. As a table-fish it is in high estimation, being of a delicate flavour, and considered as not greatly inferior to the Smelt.

GRONOVIAN CARP.

Cyprinus Gonorhynchus. *C. rostro prominente angulato-rotundato, corpore cylindrico.*

Carp with prominent obtusely-cornered snout, and cylindric body.

Cyprinus Gonorhynchus. *C. pinna ani radiis octo, corpore cylindrico. Lin. Gmel. p.* 1422.

Gonorhynchus. *Gronov. zooph. p.* 55. *t.* 10. *f.* 2.

Length about nine inches: scales small: lateral line strait: dorsal fin situated towards the hind part of the body as in a Pike: ventral fins opposite

the dorsal: anal pretty near the tail, which is slightly forked. Native of the seas about the Cape of Good Hope, and first described by Gronovius, from a dried specimen: colour uncertain.

MINOW.

Cyprinus Phoxinus. *C. atro-viridis flavo cæruleoque varius, abdomine argenteo-rubescente, cauda furcata.*

Blackish-green Carp, with blue and yellow variegations, reddish-silvery abdomen, and forked tail.

Cyprinus Phoxinus. *C. pinna ani radiis octo, macula fusca ad caudam, corpore pellucido. Lin. Syst. Nat.*

Cyprinus teretiusculus, pinnis ventralibus anali dorsalique radiis decem. *Bloch. t. 8. f. 5.*

This well-known species may be numbered among the most beautiful of the European fishes: it seldom exceeds the length of three inches, and is of a slender and elegant shape: the colours are generally as stated in the specific character, but vary greatly in different specimens, and at different seasons of the year: sometimes the colour of the upper parts is rather blue than green, and the abdomen in some is of a bright red, in others white or silvery with a tinge of yellow: the scales are very small: the lateral line strait and of a golden yellow. The Minow is frequent in clear gravelly streams and rivulets in many parts of Europe. In our own country it is observed to appear first in March, and to disappear in the beginning of October, at which period it secretes itself beneath the mud, &c. It is of a gregarious nature, and fre-

quently assembles in small shoals near the surface of the water, especially in bright weather, being fond of warmth: it usually spawns in the month of June, and is often observed to be found in spawn during the greatest part of the summer. From its small size the Minow is not much regarded in the list of edible fish, though it is said to be extremely delicate, and, where found in great plenty, is occasionally used for the table. It is much more frequently the victim of anglers, who procure it for the purpose of a bait for various fishes, and particularly for trout.

APHYA CARP.

Cyprinus Aphya. *C. subfuscus, subtus albo-ferrugineus, iridibus rubris.*

Brownish Carp, whitish-ferruginous beneath, with red irides.

Cyprinus Aphya. *C. pinna ani radiis novem, iridibus rubris, corpore pellucido. Lin. Syst. Nat.*

Cyprinus radiis novem in pinna anali dorsalique. *Bloch. t.* 97. *f.* 2.

This is a small species, somewhat allied to the Gudgeon in appearance, but scarcely measuring more than two or three inches in length, and is of a pale brown colour on the upper parts, and whitish or reddish beneath: the scales are middle-sized, and easily deciduous, and the fins of a greenish grey. It is of a gregarious nature, and is found in great plenty about the coasts of the Baltic, and in the rivers of the northern regions; particularly Sweden and Norway. It is also said to be frequent

in those of Siberia. It is said to be a delicate fish, but, from its very small size, is more frequently used as a bait than for the table. It may not be improper to observe that the name *Aphya*, by which this species is distinguished by Linnæus, seems to have been applied by the ancient writers, in a sort of vague manner, to such small fishes as they supposed rather to have been produced from the foam of the sea, or in an irregular manner, than by the usual process of Nature.

RIVULET CARP.

Cyprinus Rivularis. *C. pinna anali dorsalique radiis octo, corpore fusco-maculato. Lin. Syst. Nat. Gmel. Pall. it.* 2. *p.* 717.

Carp with eight rays in the dorsal and anal fin, and body spotted with brown.

A VERY small species, not exceeding the size of the *C. Aphya:* shape slightly cylindric, and sub-compressed: scales very small: head obtuse, sub-tetragonal; with several large scattered pores on the upper part: irides silvery: lateral line strait: fins pale; the pectoral fins of a rounded shape. Native of the region of the Altaic mountains, inhabiting small streamlets and hollows.

WHITE-BAIT.

This small fish, which is extremely plentiful at particular seasons in the river Thames, is supposed to be the young of some species of the genus Cyprinus, though it is not agreed to what species it should be most properly referred: its general history is so well detailed by the ingenious author of the British Zoology that it will be best given in his own words.

"It is evident that it is of the Carp or Cyprinus genus: it has only three branchiostegous rays, and one dorsal fin; and in respect to the form of the body is compressed like that of the Bleak. Its usual length is two inches: the under jaw is the longest: the irides silvery, the pupil black: the dorsal fin is placed nearer to the head than to the tail, and consists of about fourteen rays: the side-line is strait: the tail forked: the tips black: the head, sides, and belly are silvery; the back tinged with green."

During the month of July, adds Mr. Pennant, there appear in the Thames innumerable multitudes of these small fishes, which are known to the Londoners by the name of White-Bait. They are esteemed very delicious when fried with fine flour, and occasion, during the season, a vast resort of the lower order of epicures to the taverns contiguous to the places they are taken at.

MORMYRUS. MORMYRUS.

Generic Character.

Rostrum productum: Os terminale.	*Snout* produced: Mouth terminal.
Dentes plures, emarginati.	*Teeth*, several, emarginated.
Apertura linearis, absque operculo.	*Aperture* without gill-cover.
Membr: branch: uniradiata.	*Gill-membrane* single-rayed.
Corpus squamosum.	*Body* scaly.

THE genus Mormyrus, hitherto but obscurely understood, and differently arranged by different ichthyologists, has been lately examined with a greater degree of attention by Monsr. Geoffroy, who has increased the number of species from three (as stated in the Gmelinian edition of the Systema Naturæ), to nine. Mr. Geoffroy observes that the body is compressed, and that the structure of the tail is unusual, being of a considerable length, and of a subcylindric and inflated appearance, on account of its containing the glands from which the oily matter along the lateral line is secreted: he also observes that the stomach is strongly muscular; that the ovarium is single; and that the swimming-bladder is almost the length of the abdomen.

KANNUMA MORMYRUS.

Mormyrus Kannume. *M. rostro decurvo, cauda bifida obtusa, pinna dorsali radiis sexaginta-tribus.*
Mormyrus with decurvate snout, bifid obtuse tail, and sixty-three rays in the dorsal fin.
Mormyrus Kannume. *Forsk. Arab. Lin. Gmel.*

Colour whitish: body much compressed: lower lip longer than the upper: lateral line strait: dorsal fin half the length of the back. Native of the Nile.

SHARP-SNOUTED MORMYRUS.

Mormyrus Oxyrhynchus. *M. rostro recto, maxilla inferiore longiore, pinna dorsali longitudine dorsi.*
Mormyrus with strait snout, lower jaw longer than the upper, and dorsal fin running the whole length of the back.
Mormyre Oxyrhynche. *Cepede.* 5. *p.* 619.

Native of the Nile: supposed by Monsr. Geoffroy to have been the *Oxyrhynchus* of the ancients.

ANGUILLIFORM MORMYRUS.

Mormyrus Anguilloides. *M. rostro acuto, maxillis æqualibus, pinna dorsali radiis viginti-sex, cauda bifida obtusa.*
Mormyrus with sharp snout, equal jaws, twenty-six rays in the dorsal fin, and bifid acute tail.
Mormyrus anguilloides. *Lin. Gmel.* Mormyre Dendera. *Cepede.* 5. *p.* 619.

Dorsal fin placed opposite the anal, and somewhat shorter than that fin. Native of the Nile.

SALAYA MORMYRUS.

Mormyrus Salahia. *M. rostro obtuso, maxilla inferiore longiore, pinna dorsali anali breviore.*

Mormyrus with the lower jaw longer than the upper, and dorsal fin shorter than the anal.

Mormyre Salahie. *Cepede.* 5. *p.* 619.

Dorsal fin placed opposite the anal: observed by Geoffroy in the desert near Salaya, where they had been thrown by an inundation, and left in a dry state.

BEBE′ MORMYUS.

Mormyrus Bebé. *M. rostro obtuso, maxillis æqualibus, pinna dorsali anali sexies breviore.*

Mormyrus with obtuse snout, and dorsal fin six times shorter than the anal.

Mormyre Bebé. *Cepede.* 5. *p.* 619.

Dorsal fin placed opposite the anal as in the preceding: native of the Nile: observed in plenty near the region of Bebe.

HERSE′ MORMYRUS.

Mormyrus Hersé. *M. rostro obtuso, maxilla superiore longiore, pinna dorsali longitudine dorsi.*

Mormyrus with obtuse snout, upper jaw longer than the lower, and dorsal fin running the whole length of the back.

Mormyre Hersé. *Cepede.* 5. *p.* 620.

Native of the Nile: called by the Arabians *Hersé.*

CYPRINOID MORMYRUS.

Mormyrus Cyprinoides. *M. rostro obtuso, maxilla superiore longiore, pinna dorsali radiis viginti-septem, cauda furcata.*

Mormyrus with obtuse snout, upper jaw longer than the lower, twenty-seven rays in the dorsal fin, and forked tail.

Mormyrus cyprinoides. *M. cauda bifida acuta. Lin. Gmel. Mus. Ad. Frid.*

Habit somewhat resembling that of the genus Cyprinus: dorsal fin opposite the anal, and of equal length. Native of the Nile.

BANÉ MORMYRUS.

Mormyrus Bané. *M. rostro obtuso, maxilla superiore multo longiore, pinna dorsali analique æqualibus.*

Mormyrus with obtuse snout, upper jaw much longer than the lower, and dorsal fin of equal length with the anal.

Mormyre Bané. *Cepede. p.* 620.

Native of the Nile: called by the Arabs *Bané.*

HASSELQUIST'S MORMYRUS.

Mormyrus Hasselquistii. *M. pinna dorsali radiis viginti, anali radiis duodecim, cauda furcata.*

Mormyrus with twenty rays in the dorsal fin, twelve in the anal, and forked tail.

Mormyre Hasselquist. *Cepede. p.* 620.

Native of the Nile: observed by Hasselquist.

END OF PART I.

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